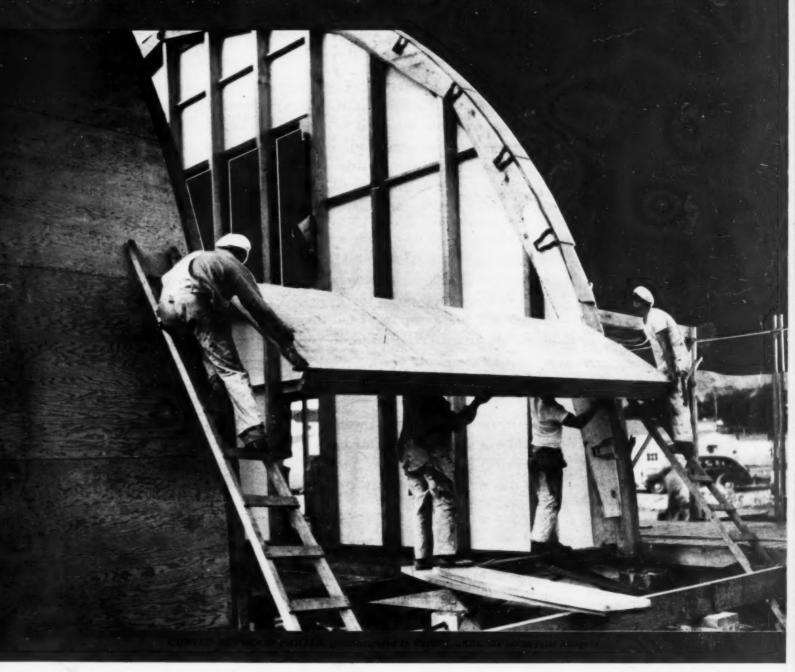
## THE OLDS DET STRUCTION MALE OLDS DE STRUCTION MALE OLDS DET STRUCTION



JULY 1942

Underpinning Machine Shop to Provide for Plant Addition • Schoolhouse Construction with Built-Up Plywood Panels • How to Make Rubber Hose Last Longer • Placing 12,000,000-cu.yd. Fill for Santa Fe Dam • Trans-Isthmian Highway at Panama

An Open Letter

### To Construction Executives

## Critical Scrap Shortage

### **GENTLEMEN:**

Much has been said and done about the great need for more scrap to keep the steel mills running, but do you men who have control of construction work fully realize the gravity of the situation?

The steel industry is hoping to produce 85 million tons or more during 1942. To make this amount of steel will require a minimum of 35 to 40 million tons of scrap iron. We used to figure 55% scrap to 45% pig iron. Now we are using less scrap and more pig iron, but with blast furnaces running 24 hours a day producing all the pig iron possible the only way we can increase our production is to get more scrap. We must not only get enough scrap to carry on this summer, but we must build up a backlog that will carry us through the winter.

Sometime ago we made a drive to clean up scrap on our own plant and secured a substantial tonnage. However, I was not satisfied and six months later authorized divisional managers to junk everything that they did not absolutely need in the operation of the business. This second check produced more than double the first cleanup. I tell this story because I believe the same situation may exist in your yards and on your construction projects.

I urge you to recheck, paying particular attention to unused construction equipment, old rails, pipe, chains, etc.

In time of war it is inconceivable to me that anyone with the authority would not act at once. Our boys at the front need steel with which to fight, need steel for protection. Your scrap steel will help save their lives and help win this war more quickly. So I urge you not to hold back. Scrap it nowtomorrow may be to late. Sincerely,

W. Sykes, President

TIN PLATE . BARS . PLATES . FLOOR PLATE SHEETS . STRIP . RAILS . TRACK ACCESSORIES . REINFORCING E

### CURRENT JOBS

.... and Who's Doing Them

Public — In Indiana, Stone & Webster Co., of Chicago, Ill., will build an industrial plant to cost over \$100,000,000; Defense Plant Corp. will finance War Department awarded \$50,000,000 plant contract in Kansas to Cory-Joslin & Macnsons, of San Francisco, Calif. In Utah, Navy Department awarded \$29,900,000 building contract to Winston Bros. Co., C. F. Hogland Co., Sollitt Construction Co., Inc., and Missouri Valley Bridge & Iron Co., of Minneapolis, Minn. Stone & Webster and Blodget, Inc., of Boston, Mass., were awarded an industrial plant contract in Texas, to cost approximately \$16,000,000; Defense Plant Corp. will finance. Navy Department awarded a \$16,654,000 contract for additional facilities in Indiana to Maxon Construction Co., Inc., of Dayton, Ohio. An industrial mill in Texas will be built by Southwestern Construction Co., of Houston, for approximately \$14,000,000, to be financed by Defense Plant Corp. Stone & Webster Engineering Corp., of Boston, Mass, received \$14,000,000 Navy Department contract to build reinforced concrete buildings in Pennsylvania. Successful bidder for industrial plant contract in Kentucky, was Struck Construction Co., of Louisville, with bid of \$12,000,000.

A \$10,214,000 contract for additional facilities in California was awarded to William Simpson Construction Co., of Los Angeles, by Navy Department. Military housing project in Massachusetts is under way by Matthew Cummings Co., of Boston, Mass., for \$10,000,000. In Nebraska, \$9,500,000 building contract is under construction by Sioux Ordnance Contractors, Inc., of Sidney, composed of Peter Kiewit Sons Co., of Omaha, George W. Condon Co., also of Omaha, Morrison-Knudsen Co., Inc., of Boise, Idaho, Gunther & Shirley and Ford L. Twaits, of Los Angeles, Calif. Morton C. Tuttle Co., of Boston, Mass., is engaged in building an industrial plant in Massachusetts, at an estimated cost of \$7,500,000; Defense Plant Crp. will finance. Military housing project is under construction in Colorado by Frank M. Kenney, of Denver, at an estimat

### **HEAVY CONSTRUCTION**

Davis Dam and power house in Arizona will be constructed by Utah Construction Co., of Ogden, Utah, for \$18,996,392. Contract for improvements outside United States, amounting to \$38,747,850, went to Hawaiian Dredging Co., Ltd., Raymond Concrete Pile Co., Turner Construction Co., Morrison-Knudsen Co., J. H. Pomeroy Co., Inc., W. A. Bechtel Co., Utah Construction Co., and Byrne Organization, of New York. Virginia Engineering Co., Inc., of Newport News, was awarded \$8,440,520 contract by Navy Department for improvements in Virginia. Sewage treatment plant will be built in California by Fritz Ziebarth. of Long Beach, for less than \$1,000,000. Contract for buildings and improvements in Texas was awarded to Brown-Root & Bellows, of Austin, with low bid of \$6,200,000. Improvements in Colorado are under way by Broderick & Gordon, of Denver, for \$5,000,000. Carter-Halls-Aldinger Co., Ltd., of Vancouver, were successful bidders for airport contract in British Columbia, with bid of \$4,500,000. Briggs & Bellows, of Eagle Pass, Tex., was awarded contract to make improvements in Texas for approximately \$4,000,000. Foundation work is under way in Florida by The Mackle Co. and Leach Construction Co., of Miami, for less than \$1,000,000. Cone Bros. Contracting Co., of Tampa, and J. D. Manley, of Oscala, received contract for sewage facilities in Florida, at an estimated cost of \$1,000,000.

Among recent highway contract awards are the following: California: \$543,331 to P. I. Tyler, of Oroville, and Parish Bros... of Sacramento. Connecticut: \$201,187 to D. V. Frione & Co., Inc., of New Haven; \$450,100 to Oneglia & Gervasini, Inc., of Torrington. Iowa: \$5,000,000 to Trompete Construction Co., of Peru, Ill., and Weir Construction Co., of Burlington, Illinois: \$211,359 to C. J. Morits, Inc., of Effingham; \$245,132 to Mid-American Engineering Corp., of Skokie; \$268,137 to Concord Construction Co., of East St. Louis; \$365,250 to Standard Paving Co., and White Consolidated, Inc., of Chicago; \$211,057 to Chas. G. Gilnore Asphalt Products Co., of Anna; \$212,498 to L. Marsch, of Morrisonville; \$298,634 to Granite Bituminous Paving Co., of St. Louis, Mo.; \$287,537 to Walsh Oil Co., of Joliet. Kentucky: \$345,476 to Nally & Mudd, of Springfield, Carey Construction Co., of Lexington, and H. F. Mathis. of Bardstown; \$686,974 to White Consolidated, Inc., of Chicago, Ill.; \$463,303 to Codell Construction Co., of Winchester; \$190,280 to Allen-Codell Co., of Winchester. Kansas: \$1,041,928 to Inland Construction Co., of Omaha, Neb. Michigan: \$513,023 to Bridgeport Core Sand Co., of Saginaw. Mississippi: \$695,888 to Chandler Brothers, Inc., of Virgilina, Va.; \$660,000 to E. E. Morgan & Co., Inc., of Jackson, Nebraska: \$504,000 to Lowe & Greene, of Cedar Rapids, Ia. Nevada; \$313,800 to Isbell Construction Co., of Reno, New York: \$1,086,879 to Chas. F., Vachris, Inc., of Brooklyn; Oregon: \$236,925 to E. C. Hall, of Eugene, and J. C. Compton, of McMinnville; \$272,845 to C. J. Eldon, of Portland; \$264,934 to Hall & Co., of Eugene, Pennsylvania: \$696,721 to Dinardo, Inc., of Pittsburgh, Oklahoma: \$582,562 to Moran & Buckner, of Muskogee. Texas: \$421,355 to Harrison Engineering & Construction Co., of Black River Falls.



For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How PHOTOELECTRIC RELAY operated lights of block signal sys-How WALL WAS UNDERPINNED with sectional steel pipe pile jacked in place and filled with concrete. —p. 43

How LOW-COST SCHOOLS were built of prefabricated plywood -p. 43 panels. —p. 46

LAMINATED TIMBER RIBS were used for roof frame of school auditorium. How JOIST HANGERS on timber ribs facilitated erection of root How HUGE STEEL PINS made closure connections on cantilever steel bridge. —p. 40

How WOOD WINDOW SASH for industrial buildings was designed to take advantage of experience with steel sash. —p. 50

How WELDED REPAIRS restored dragline bucket for gravel pit use —p. 52 How CONCRETING SIGNALS were given by telephone or short-wave radio to cableway operator. —p. 53 wave radio to cableway operator. —p. 5.

How CARELESS HANDLING shortened service life of rubber hose —p. 55
How **THREE TYPES OF TRUCKS** were chosen to haul various classes of material for earth-fill dam. —p. 56 es of material for earth-fill dam. —p. 56
How GRIZZLIES were installed to classify coarse material for dam
—p. 56 How BOTTOM-DUMP UNITS were equipped to strike off top of —p. 58 windrow previously dumped. —p. 58
"LAY-DOWN" CONCRETE BUCKET facilitated loading from truck mixers. —p. 58 How ROAD MIXER mounted on motor grader mixed resurfacing material for highway. —p. 60
How PORTABLE CUTTING MACHINE flame-cut and beveled ends of pipe for welding. —p. How **STEAM GUN** cleaned grease, oil and dirt from construction How POWER EQUIPMENT speeded work on trans-isthmian high How U. S. ENGINEERS beat spring thaw in getting equipment to Alaska highway.

How SELF-POWERED TURNTABLE was built to rotate trucks weighing 55 tons, loaded.

How TOOTHED BULLDOZER BLADES uprooted stumps for land —р. 66 —р. 67 —р. 68 clearing.

How TRUCK-MOUNTED RIG drove guard-rail posts.

How PIPE TRAVELER applied asphalt coating to oil line.

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### The Story That Must Be Told

BETWEEN THE LINES of today's war news is written a story that is even more vital than the news itself. For through that story we begin to discern the pattern of victory, not yet complete in all its details but increasingly clear in its essentials.

It is the amazing story of how American industry has responded to the call for the weapons of total war, of how its technicians, workers, and managers are driving through an unprecedented task of fantastic size and complexity.

France fell in June 1940. During that month this country produced about \$150,000,000 in war goods. By June 1941 the Nazis had overrun the Balkans; and in that month our war production was \$800,000,000. The fateful month of December 1941 gave us an output of \$1,

800,000,000 – an increase better than tenfold in eighteen months. And in May 1942 our total expenditures for war equipment and supplies mounted to the staggering total of \$3,500,000,000.

This is an increase of twentyfold within two years, of itself a stupendous industrial achievement. But what is even more important, that achievement already is making itself felt the world over – in the Orient, in Australia, in Libya, in Europe, in the Coral Sea, at Midway Island, at the Aleutians, and wherever else we find a battlefront manned by free men.

To accomplish it, many industries have been pouring out war materials at a rate that only six months ago did not seem even remotely possible. Starting from scratch, our factories have turned from their peacetime jobs, first to meet and then to surpass the most hopeful estimates of what might be expected of them.

To do this they have drawn heavily upon all of their resources. Their skilled and unskilled man-power has thrown into the task a war-born will to work; their research staffs have bent to it all of their scientific resources; their engineers have applied to it their utmost ingenuity; their executives have devoted to it the full measure of that managerial skill which has won for American industry the respect of the modern world.

For the first time in history we have pushed the accelerator of the world's greatest engine of mass production down to the floorboard. Always in times of peace, factory men have had to gear production to what the markets would take. But now the market they are called upon to serve is hungry for the last ounce of po-



Two men who know the story best: Donald Nelson, Chief of the U.S. War Production Board, and (right) Oliver Lyttelton, Great Britain's Minister of Production

tential output. For war confronts industry with a demand limited only by its capacity to produce.

During these feverish months, while a desperate world has watched breathlessly to see how American industry would perform as the arsenal of democracy, we of McGraw-Hill have followed with mounting pride—at times almost with wonder—a new miracle of industrial achievement.

Some day the full story of this American industrial effort will fill a brilliant chapter in the epic history of our times. Meanwhile it would be premature to celebrate the completion of this task. For victory has not yet been won; that still lies at the far end of a road that we may find to be long and arduous.

But even now we can be certain of one essential of that victory. American industry is doing its job; it is delivering all that the people have asked of it – and more.

As I have watched with my associates the unfolding of this picture. I have wished that it were possible to broadcast it, in full color and wealth of detail, to the people of America, so that they could understand at least, in part, the job their industry is doing for them. It would help, it seemed to me, if the men of industry themselves, each so intent on his own task, knew what their fellow-workers in other fields have been doing.

However, the managers of industry have been far too busy **doing** to talk. They are going to be just as busy for some time to come. Naturally, many details are yet to be spread upon the record and, indeed, the full story cannot be told. But that part of the story that can be told is well worth the telling and the hearing, if only

for its revelation of the spirit of an awakened America, throwing its all into the fight against the tyranny that has brought so many of the world's little people under its heel.

The 1941 war production of the United Nations, exclusive of the United States, equalled the total 1941 war output of Germany with all of its captive plants and enslaved labor. Since Germany's 1941 operations were at maximum capacity no further increase is possible. British output has been expanding to the point where its 1942 production is considerably ahead of Germany's.

In May 1942 American war production passed the British output 50 days ahead of schedule. In 1943 it will be 3 times that of the British.

This has been brought about under the leadership of Donald Nelson and the War Production Board, the Army, the Navy, the

Maritime Commission, with the cooperation of management and labor. It has been furthered by the cooperation of Oliver Lyttelton, British Minister of Production, and other British production authorities.

But the story goes far beyond that. It gives us a glimpse of the America as it will emerge from this war, its industries again setting world standards of production, which will become the spearhead of our post-war economy.

This is a story that cannot be adequately told in generalities. It must be told in some detail. For instance, the great accomplishments of the machine tool industry, the great forward strides made by the aviation industry, the tremendous achievements of the chemical industry, the amazing conversion of many industries will warm the hearts of Americans.

These aspects of the subject deserve the fullest treatment and will be told month by month in these pages until the story has been completely unfolded. We will try to give a concise overall picture of the war job that industry has done and still is doing. You will find it a thoroughly American story of high American achievement in which every American can take pride and from which every American can take hope for the future of his country.

The story is far too significant to be withheld any longer.

James M.M. Graw. Jr.

President, McGraw-Hill Publishing Company, Inc.



## 'Incor' changes "NEXT WEEK" INTO "Tomorrow"



Time Won't Wait . . . Use 'Incor'

AMERICA is fighting against time—every day saved brings victory nearer. Time-saving is 'Incor's contribution to the nation's all-out war effort. 'Incor' changes next-week into tomorrow... concrete placed today is in use tomorrow... roads, streets, airport runways, industrial floors, loading docks, machinery bases... in use days and weeks sooner.

Repaving four blocks of Maryland Street in traffic-congested downtown Indianapolis called for 5-inch concrete resurfacing on both sides of car tracks. R. M. Bowen and W. D. Vogel, Indianapolis contractors, used ready-mixed 'Incor' concrete exclusively. On intersection shown, excavation started morning of Sept. 10, pavement poured 2 p. m. same day, opened to traffic following morning—minimum interference to merchants and public. Use 'Incor'\* 24-Hour Cement for top speed at lowest cost. Write nearest Lone Star office for service data.

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Engineers and construction men everywhere are switching to the Monotube Method to save time on foundation work!

TNHEARD of only 14 years ago, the Monotube Method of installing castin-place concrete piles has been used to date in 34 of the 48 states and in the District of Columbia. Sizeable installations have also been made in Canada, Panama, the Bahamas, Hawaii and South America.

Today, under the impact of war, engineers and construction men in ever-increasing numbers are turning to Union Metal Monotubes because of their proven ability to produce foundations faster. Whatever the nature of your jobs, Monotubes will give you these four time-saving advantages:

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- 4. SPEEDY Inspection. Hollow, tubular design enables you to inspect casing quickly and thoroughly from top to toe, prior to concreting.

Union Metal Monotubes are made in a gauge, taper, and size to meet load-bearing requirements in any soil condition. And experienced Union Metal engineers will show you how they can be used to best advantage. Write today for Catalog No. 68A.

THE UNION METAL MANUFACTURING COMPANY

Canton, Ohio



he application of forces of known and controlled magnitudes and frequencies to structures, equipment or materials is of prime importance in the field of testing. Measurement of forces, displacements and strains necessarily follow. Some of the machines and instruments for the production and measurement of forces, vibrations and other reactions are:



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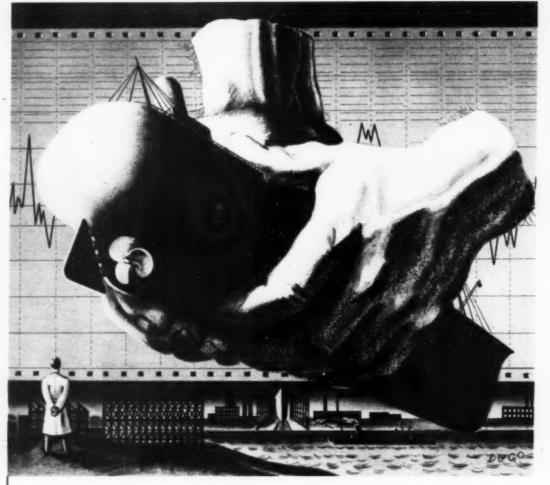
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### He gives a ship its "shake-down cruise" before it puts to sea...

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When a structure is likely to be subjected to vibratory loads of unknown magni tudes, preliminary simulation of service conditions provides an invaluable check against the designer's calculations.

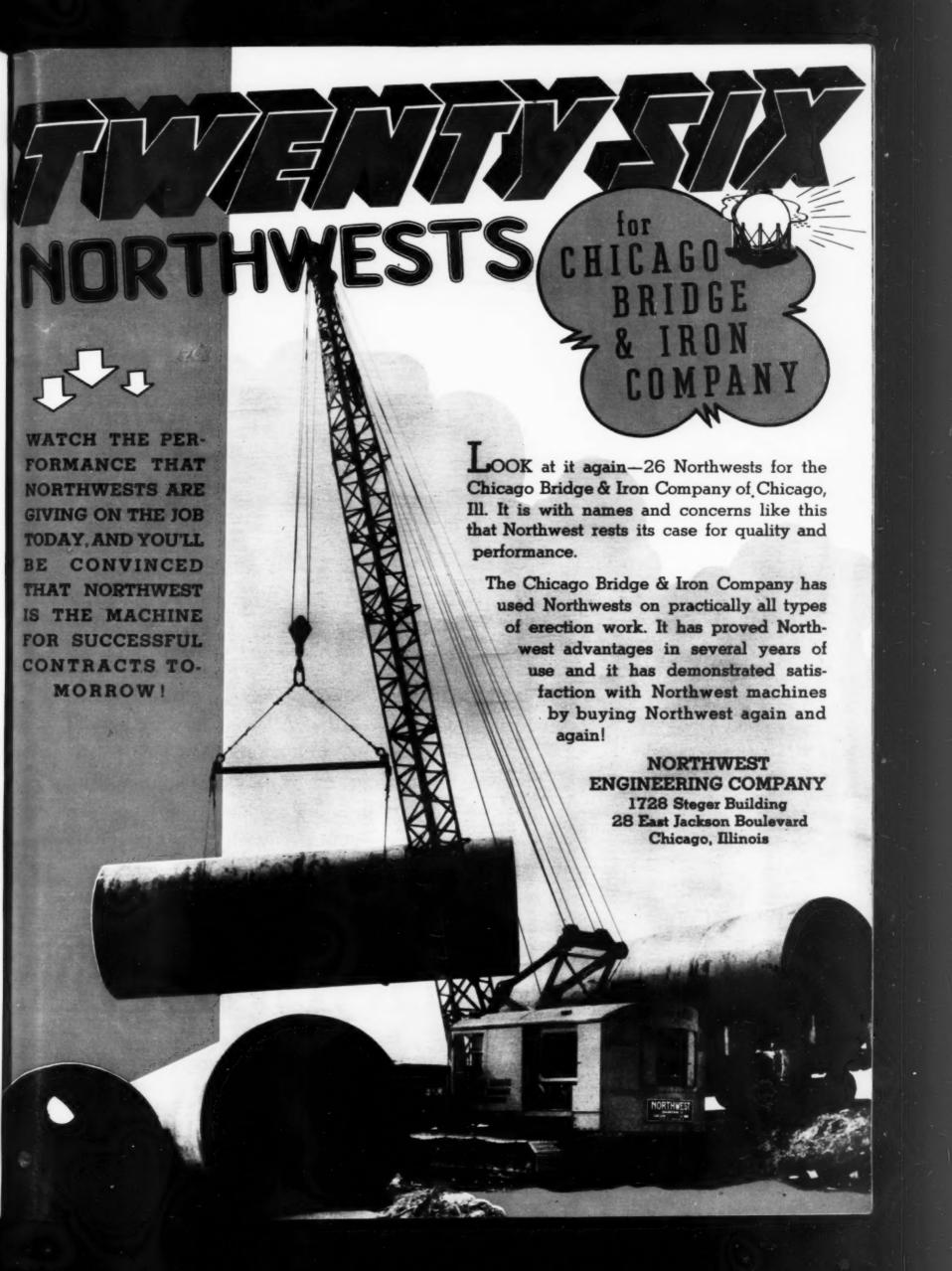
With suitable equipment the vibratory loads can be artificially induced; service stresses, strains and displacements be produced in advance; the designer's calculations be proved.

WAUGH LABORATORIES has the personnel, experience and equipment to do the work that will provide the facts required. Specializing in structural testing, it is prepared to supply a complete line of test instruments and machines, together with an engineering field service and laboratory facilities for analyzing strains, forces and vibrations in and on structures of all kinds.

For service information relating to your individual problem, you are invited to write to Nereus H. Roy, *Director*, at the address below.



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The smooth, velvety, effortless control force that makes a big power shovel perform in tough cemented shale as if it were an old time steamer. OSGOOD Air Control is simple in operation, easy to maintain, and costs next to nothing. Sooner or later, you will surely want to know all about OSGOOD Air Control. Why not investigate now?







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Like a wire entanglement, a matted thicket lies across our Army's path to a vital objective. "Bring on the tractors!" is the call of the fighting Engineers.

With tusks of steel and more power than a herd of elephants, the "Caterpillar" Diesels move in. With broad, deep-grousered tracks providing a firm foothold, they drive their bulldozers forward in mighty thrusts — toppling trees, uprooting stumps, sweeping them aside together with brush and rocks. . . . The Infantry, guns and tanks are going through!

On scores of other battle-front jobs, "Caterpillar" Diesel Tractors are helping to deliver similar blows for the cause of free peoples. Building military roads, causeways,

bridge-heads, fortifications, gun emplacements; rescuing mired trucks and disabled tanks; moving heavy artillery — are some of the assignments. . . . Because "Caterpillar" Diesels are built with the power, stamina and dependability to see things through!

And there are many more on the way! As fast as "Caterpillar" production can turn them out, all "Caterpillar" products—tractors,

motor graders, engines and electric sets—will be available to serve in this all-out war.

Those already doing useful work in supporting fields—oil, mining, lumber, construction, manufacturing, transportation, agriculture and other essential industries — will have all the replacement parts and mechanical service "Caterpillar" and a world-wide dealer organization can provide to keep them fighting.

### CATERPILLAR DIESEL

CATERPILLAR TRACTOR CO. . PEORIA, ILLINOIS

TO WIN THE WAR: WORK-FIGHT-BUY WAR SAVINGS BONDS!



Wire rope is like plain cooking until war reveals the vital part it plays in every heavy industry. It helps do the grunt-and-sweat jobs of production, and in America we have always taken production for granted. Only now do we realize how our production as a nation is helping our own nation and aiding our allies. Fortunately, all American manufacturers of wire rope make Preformed Wire Rope. This is helping immensely, for Preformed gives longer service, therefore speeds production. It also makes the same amount of steel go farther, through giving longer wear, thereby saving steel for other war uses . . . Regular wire rope for the stand-still jobs, Preformed for the harder jobs of action and hard wear.

### Preformed wire rope

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER

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### REPAIR PARTS

Genuine Thew-Lorain factory made parts can save repairs, increase the life of your Lorain. Many distributors carry a representative stock, and are "Johnny-onthe-spot" 24 hours a day.

FIELD SERVICE—Many distributors maintain service trucks for speedy delivery of parts and service right to your job. Fewer working hours lost with on-the-job service like this.

**REBUILDING**—You can prolong the life of much machinery by rebuilding it in time. Lorain distributors employ expert service men who know Lorain equipment—know how to rebuild it properly.

**CLEARING HOUSE**—If you want information on rentable equipment or booms that you may need for converting present machines, see your Lorain distributor. He knows what is in the territory and what is available.

Typical parts department of a Lorain Distributor.

### YOUR RESPONSIBILITY

is to keep your equipment working every minute. When problems arise, we urge you to use Lorain Distributor Service. There is a distributor near you—ready, willing and able to help you make your equipment last longer and work faster.

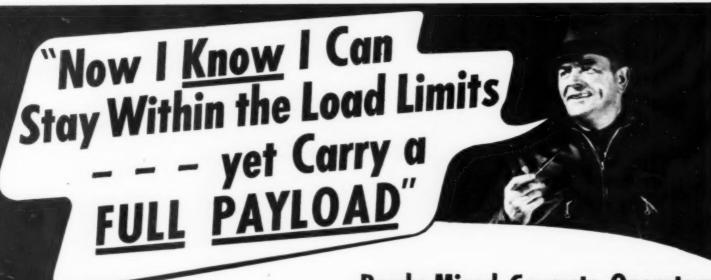
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like the new No. 3 Smith-Mobile because it's a WEIGHT-SAVER. Approximately 1000 lbs. lighter than competitive 3 yard mixers, this new Smith-Mobile can be mounted on a 2-axle truck... carry a FULL PAYLOAD... and still stay within the stringent load limits imposed by practically all the states. There's no need to invest in an expensive 3-axle truck, with its extra expense, maintenance costs, tires, etc. A 2-axle truck reduces costs, yet fills the bill 100%.

Of course, the new No. 3 has all the usual Smith-Mobile features: HIGH DISCHARGE without hoist . . . CONTROLLED DISCHARGE without segregation... VISIBLE MIXING...FEED CHUTE CHARGING . . . etc. No other truck mixer can give you all these features. Ask for Smith-Mobile Catalog No. 198-B.





Yes, you can "count 'em by the dozens," these ships of every size and shape and class, being launched almost daily, to meet the needs of National Victory. But, you can also count, and by far more than dozens, too, the launching of many building projects where steel is being saved for ships, by builders and contractors who are eagerly adopting Richmond's Engineered form-tying methods, in preference to such "make-shift," "homemade", devices as wire, band or rod ties fabricated on the job. And, the quantities of steel thus saved are important. In fact, almost spectacular! For, get this—

### RICHMOND MAKES I TON OF STEEL DO THE WORK OF 3 TONS

—besides which, the "Richmond Way" is the profit-making way in any sort of concrete form work. Profit-making because you do a better, faster, less costly job by using fewer ties; erecting and stripping forms in less time; less ruined lumber. Again, profit-making because our free technical and estimating service provides, for your men, working blueprints of your job sections scheduling the quantity, spacing and location of ties needed, thereby climinating costly hours of work and worry. And again, profit-making because you don't tie up your money in Tylags, Tycones, Flat Washers, Tywrenches, etc. Richmond loans you these working parts! Talk about a complete "package"! That's exactly what you get from Richmond—and only from Richmond. A complete package containing many an extra dollar of profit for you, plus a valuable recognition as aiding our National Victory. Prove all this? Yes, just ask us.

### We Sell All Types...We Recommend Only Prefabricated Ties...They Cost Less!

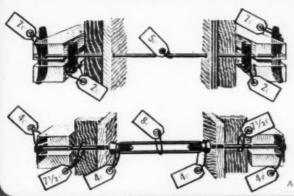
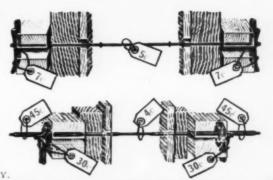


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\*BASED ON A 12\* CONCRETE WALL

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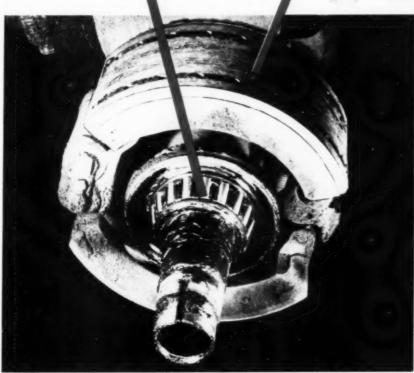
816-838 LIBERTY AVENUE



## On the Rollers

Right. Timken Bearing after 3 i,000 miles of service:rollers still protected with heat-resisting, wear - defying Texaco Manfak Heary Duty.





On the rollers-off the brakes.

### THEY PREFER TEXACO

- ★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.
- ★ More locomotives and cars in the U.S. are lubricated with Texaco than with any other brand.
- ★ More revenue airline

- miles in the U.S. are flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

America's fleet operators are getting safer braking, increasing the life of wheel bearings, and saving valuable man-bours of repacking time . . . by lubricating their wheel bearings with Texaco Marfak Heavy Duty.

Texaco Marfak Heavy Duty stays in the bearings, protecting against friction, despite the highest operating hub temperatures. It stays off the brake lining in hottest summer weather, yet functions perfectly in the coldest winter weather.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Automotive Engineer will gladly cooperate... just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.





Tune in the TEXACO STAR THEATRE every Sunday night . . . CBS

TEXACO TEXACO Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



Here are some helpful tips you can pass along . . . things that mean even longer life for Roebling "Blue Center" Steel Wire Rope . . . steel saved for U. S. at War!

**Lesson One:**—take a piece of string and pull it gently . . , you'll find it will stand an unusual strain before breaking. But snap the same string quickly and it's easily broken.

Same thing applies to a wire rope. In any kind of hoisting operation, it's vital that the rope should have no slack at the beginning of the lift—else the load might be applied suddenly and then the impact on the rope will be greatly in excess of weight of the load being handled. So don't jerk your ropes.



Lesson Two:—a hammer weighing only a few pounds can produce a blow having the force of a couple of tons. The load on a wire rope is like a hammer—striking a blow on the rope whenever you start the load too quickly. Even without slack, the

rope gets a tremendous impact when power is applied too fast—as in the case, for instance, when the operator of a shovel moving a boulder tries to knock it out of the way instead of easing it out.

And it's the same when the rope is going the other way. When even a light load is stopped suddenly while being lowered, the rope is subjected to a much greater strain than the equipment could ever apply to it in hoisting. So don't jolt your loads. Brakes should be applied smoothly and uniformly, and at the slightest sign of "grab" should be eased off. Brake your load over a longer period and your rope will last over a longer period.

In general, shock loads will remove from the rope the very elasticity that is put in to absorb normal impact, while careful handling will preserve the rope's elasticity and keep it in condition to deliver long life. Of course, the way a machine is run always affects its general maintenance. It's a wellknown fact that some people are harder on machinery than others. An operator can push a machine (and a rope) just so far to get extra work out of it-beyond that, the punishment takes its toll of both the machine and the rope-and breakage begins to cost more than the extra work is worth. But in these days when rope steel is vital to the war effort, wire rope must not be abused.

Lesson Three: -a pitch-fork was not made to shovel sand. Likewise, "borrowing" ropes is very seldom practical. In these times of priorlties and shortages, some operators have been "borrowing" ropes from one operation and installing them on another.



Before you "borrow" a rope, make a careful analysis to see whether you won't get better ultimate economy out of putting the right new rope on the equipment that needs it, and taking the necessary steps to preserve the used rope and make it last on the job it's now doing.

Roebling "Blue Center" Steel Wire Rope is made to deliver a long lifetime of service—it has built a reputation for just that, wherever wire rope has a routine or unusual job to do."



JOHN A ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY

Branches and Warehouses in Principal Cities

More ways to help you conserve wire rope coming in this space next month.

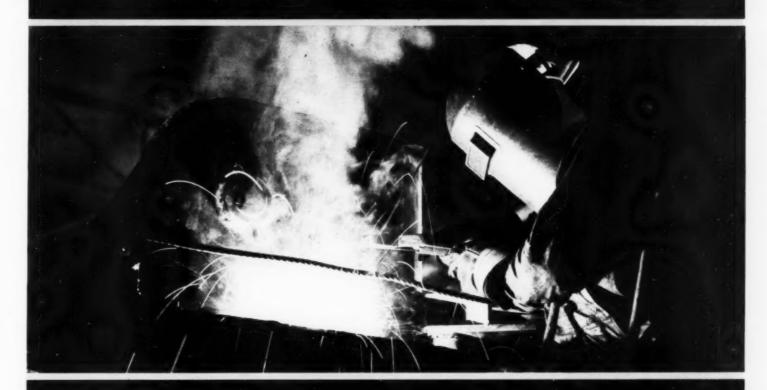


ROEBLING
"Blue Center"

PREFORMED OR NON PREFORMED

Page 18 - CONSTRUCTION METHODS - July 1942

### Working hard today-



### -planning for tomorrow!

That's what LaPlant-Choate equipment is doing, what your dealer is doing, and what we are doing . . . working hard today, but, thinking and planning for tomorrow.



LaPlant-Choate equipment is working hard on every front, at home as well as abroad. It is building airports, strategic roads, army camps and numerous other military projects and industrial plants. It is used

in combat — clearing trails, cleaning up debris, levelling bombed airports, and scores of other jobs. That's why their continued production is so vitally necessary and it's why the Armed Forces get them and civilian needs must wait.

The dealer — your dealer — is working hard today. His task is one of the greatest, for he must keep all this equipment rolling. His skilled service men, his parts stocks, are meeting the emergencies of this war. We all know why we can't get new machines and we know that we must keep the ones we have in tip-top condition. Maximum efficiency of every machine is needed if we are to win the war in the shortest possible time. For long life and full production of your LaPlant-Choate equipment, no one is so well-equipped to help you solve parts and service problems as your "Caterpillar" — LaPlant-Choate dealer. He will help you keep the home front from becoming the battle-front!

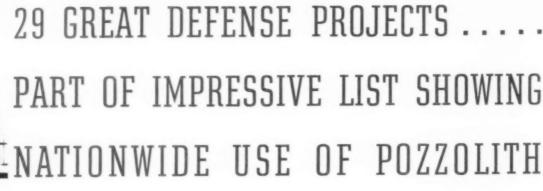
We are working hard, too, here at the factory. And we are thinking and planning for tomorrow. We are building more machines than ever before in our history. We are doing other things, too — things we can't talk about right new. But we can tell you of our plans for your future and ours.

We have always prided ourselves on the quality of the machines we build. Into them have gone years of careful, proved design. The best materials have been used by skilled workmen in building them. Now, even greater long-range planning is the order of the day. The war will end, and when it does, new unheard-of earthmoving projects will be required. Highways and secondary roads will be needed in Canada, Central and South America, as well as the rest of the world. The tremendous numbers of airplanes now being produced are going to need peace-time ports. Dams for water conservation and power will again start construction. And the LaPlant-Choate equipment of tomorrow will make new earthmoving history, for this company's engineers are thinking and planning for tomorrow's owners. They want these owners to have the equipment that will move earth at lower cost than you have ever dreamed of.

So, until we can offer and you can buy the equipment you want and need, let your dealer help you keep your present LaPlant-Choate equipment rolling — efficiently and economically!







- 6 SHELL LOADING PLANTS...
- 5 ALUMINUM COMPANY PLANTS...
- 4 REMINGTON SMALL ARMS PLANTS...
- 4 ORDNANCE DEPOTS...
- 3 ATLANTIC BASES...
- 2 DOUGLAS AIRCRAFT PLANTS...
- 3 OTHER GIANT AIRCRAFT PLANTS...
- 2 SHIPYARDS...



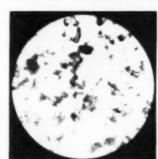
MASTER

## of yards of concrete

LEADING ENGINEERS ... ARCHITECTS AND BUILDERS ARE USING POZZOLITH (CEMENT DISPERSION) TO GAIN THESE TIMELY AND IMPORTANT ADVANTAGES

**HOW CEMENT DISPERSION WORKS** 

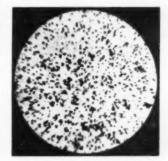
- ✓ SPEED
- HIGHER STRENGTH
- **✓** LOWER COSTS
- **✓** BETTER CONCRETE



Cement suspended in water UNDISPERSED

### WITHOUT POZZOLITH

In a normal concrete mix, cement particles tend to bunch together, thereby (1) limiting hydration and (2) trapping water within the cement clumps. (See photomicrograph above).



Cement suspended in water DISPERSED

### WITH POZZOLITH

Cement Dispersion drives these particles apart and (1) exposes their entire surface area to hydration, at the same time (2) making the water entrapped in the clumps available for lubrication of the mix. (See photomicrograph above).

Pozzolith (Cement Dispersion) through its action of increasing the efficiency of cement and permitting reduction of the water-cement ratio, offers the above important advantages to all concrete construction.

Our field force of experienced technicians is ready to serve you at any time. Write or wire for Research Paper No. 36, "Economics of Cement Dispersion", and complete facts showing what Pozzolith can do for you.

THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO

TORONTO, ONTARIO

BUILDERS







## HAULING WHAT IS NEEDED WHEN IT'S NEEDED WHERE IT'S NEEDED

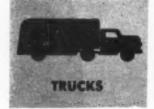
Hauling on time is a vital war operation. Military strategy dictates where to haul, what to haul and when to haul. Transport strategy employs the most dependable method of getting the job done.

Around the world today, in the trackless wastes, wherever war dictates our defenses be set up, supplies, machinery and materials must be delivered on time regardless of weather or terrain. One of Athey's major roles in the War effort is the building of hundreds of trailers. Built in capacities from six to forty tons, their broad Forged-Trak Wheels permit load-carrying ability over mud, snow, sand, brush, and rocks, delivering dependably what is needed, when it's needed and where it's needed. Athey Truss Wheel Co., Chicago, Illinois.

ATHEY TRUSS WHEEL CO. CHICAGO, ILLINOIS



The Outstanding New
ALL-PURPOSE, HEAVY-DUTY LUBRICANT
For Every Type of Diesel and Gasoline Engine\*











### FEATURING\_

- 1-Unusual resistance toward oxidation.
- 2-High detergency-helps keep engine clean-minimizes wear.
- 3-Non-corrosiveness to alloy bearings and other engine parts.
- 4-Minimum tendency to form lacquer, varnish and sludge.

SHELL TALPEX has passed severest engine tests with flying colors. Your Shell man has the details—call him.

\*Except for passenger cars as prohibited by OPC Recommendation No. 40, Amendment.

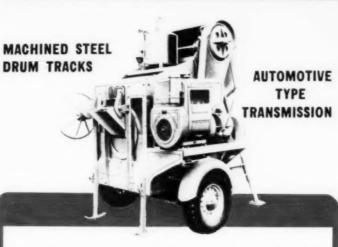
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OIL IS AMMUNITION - USE IT WISELY!



THE JAEGER MACHINE COMPANY 800 DUBLIN AVENUE COLUMBUS, OHIO

any time, any place."



### Built to MIX FASTER RUN SMOOTHER, QUIETER, LONGER



Put a Jaeger on the job and get those profits slower mixers can't produce. Load faster with Automatic Skip Shaker, mix more thoroly with Criss-Cross Action, discharge faster than any other mixer on market. Drums roll on machined tracks, chilled ball bearing rollers.
Transmission runs in oil. All sizes

trail easily on Timken bearings and pneumatic tires.

Send for Catalog. Compare Prices

THE JAEGER MACHINE CO. 900 Dublin Avenue, Columbus, Ohio World's Biggest Manufacturer of Con-crete Mixers. All Types, Sizes to 56 S.

### 250 LINEAR FT. per HOUR of 25 FT. SLAB (MINUS IT SLUMI





### and this JAEGER Type H FINISH

& Pearson Laid Up to 135 Cu. Yds. an Hou AGED OVER 120 Cu. Yds. an Hour, Day er Day, on Muroc Bomber Range, California

### Record-Breaking Production of Denser, Smoother Slab-Fewer Men

On U. S. airport, near Ft. Wayne, James A. McKay & Sons report Jaeger Spreader-Finisher team was absolutely necessary to handle the very dry concrete in 25' width.

On 86 miles of 20'-24' slab, Koss Constr. Co. used 4 Screw Spreaders, report all engineers highly pleased.

On Ford's Willow Run Bomber Plant, 4 Jaeger Finishers placed 63 miles of 20' slab in 42 days.

On Higley Airport, Jaeger Team placed 362' per hour ' slump concrete 12'6" wide without labor in front of machines and no trace of segregation.

Saved 3 to 5 men behind 34E dual paver, reports C. H. Atkinson Paving Co., Missouri.

On Pennsylvania Turnpike Adam Eidemiller did 5160' in 14 hours, Tri-State Engr. averaged 4000 sq. yds. daily on 167,000 sq. yd. contract.

Spreader, equipped to both spread and finish, laid up to 150 tons hourly of bituminous resurfacing for Barber Construction Co., Chicago.

Ask Us for Contractors' Detailed Reports and Catalog THE JAEGER MACHINE

### When attaching wire rope to a drum...

### START IT RIGHT

Wire rope is tremendously strong and tough. It can stand terrific abuse without failure. However, just because wire rope "can take it." don't expose it to abuses which can be easily avoided. Get the most out of your rope—for yourself—for your country.

One simple way to insure longer service from wire rope is to take time and care in starting it right on the drum. Be sure that there is a brake on the reel so that the rope is wound onto the drum under uniform tension. If the tension is slacked off suddenly, and then reapplied, several turns on the drum will be loose or "slushy"—even though they may be evenly wound. These "slushy" turns won't support successive layers of rope as well as their more tightly wound neighbors. When the load is applied, there is a tendency for the rope to wedge itself in between the loosely-wound turns. "Cutting-through" is possible.

A second precaution to observe in spooling a new rope onto a drum is uniform winding. Each turn should lie snugly against its neighbor. If spaces or gaps are left between turns, succeeding layers of rope are sure to "cut through." Wedging and pinching of the rope is inevitable. Some turns will be under great tension, while others won't carry their fair share of the load. Above all, avoid cross-overs—turns of rope which get out of position and cut across other turns in the same layer. Guide the rope onto the drum with a wooden bar or other handy instrument which will not abrade the rope. If this is done for the first several times the rope is spooled, the rope will tend to spool smoothly by itself thereafter.

Always start a right-lay rope at the right flange of the drum when the rope overwinds on the drum, and to the left flange when the rope underwinds (this based upon facing the drum with the rope paying off toward you and in the direction of the load). By following this practice, you reduce abrasion of the rope between adjoining turns, and help to insure a snug uniform winding job. To find out the lay of your rope, hold it up vertically in front of you. The strands in a right-lay rope move upward from left to right across the rope as shown in the accompanying illustration.

Finally, to insure the smoothest spooling, use Form-Set Wire Rope. This rope is preformed, free from locked-up constructional tensions. Experience in a wide range of applications has proved that Form-Set spools smoothly, handles easily, and tends to speed up production.



Right-lay

BETHLEHEM STEEL COMPANY



# DESIGNED FOR DIGGINGSteadily



Machinery stays in proper alignment with rigid all-welded construction of both upper and lower structures. No "weaving" — no bolts or rivets to work loose.

Greater resistance to shock loads comes with tough rolled alloy steels. There's less dead weight to swing — less strain.

Operation is smoother with automotive hydraulic control. There's less wear, fewer parts to service.

Travel is more dependable with true tractor type crawlers. Here's freedom from crawler troubles.

Without these — and other P&H features — you have less than your money should buy.

General Offices: 4494 West National Avenue, Milwaukee, Wisconsin



Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort. HARNISCHFEGER

EXCAVATORS - ELECTRIC CRAMES - ARC WELDERS PEH HOISTS - WELDING ELECTRODES - MOTORS

# the way

Army engineers figured close. No time to lose at this far flung outpost. But, a fast, compact Buckeye sewerage trench for air field drainage, sewedays, and water beating the promise by days and water beating the promise so Buckeye Bulldozers could move in for so Buckeye spreading and leveling.

AHEAD OF

SCHEDULE



This Buckeye R-B Power Finegrader
This Buckeye R-B Power of two 34-E
keeps the grade way out ahead of two 34-E
keeps the grade way out ahead material—no
keeps the grade way out ahead material—no
pavers, saving labor, time and material
pavers, saving labor, no scratch board
high spots, no low spots, no often credited
high spots, no low spots, are often credited
high spots, no low spots, are often credited
high spots, are foot grade per hour.
with 100 ft. of 24 foot grade per hour.





3/8 TO 3 YARD CAPACITY

### LINK-BELT SPEEDER

SHOVELS - DRAGLINES CRANES



### TO MATCH THE JOB

Higher speeds, greater loads and more yardage are battle cries heard on all construction fronts today. Machinery not only has to be fast, but tough and dependable to see every job through to the finish and be ready for the next one ahead. Gone are the days of immediate replacement of broken-down equipment

 even high priorities cannot assure prompt delivery of new machinery.

That is why Link-Belt Speeder shovels, draglines and cranes play a doubly important part in the Nation's war construction program. These machines are designed and built to render the type of service required under present conditions—constant full-capacity operation at highest speed . . reliability to finish a job quickly and efficiently . . . power and stamina to match the tough jobs ahead.

### LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes
301 WEST PERSHING ROAD • CHICAGO, ILLINOIS



REX PAVER operated by Lehman-Roberts Co., Memphis, Tenn. Sinclair lubricants used by this firm on large Government operations.

### SINCLAIR LUBRICANTS-FUELS

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ST PEACHTREE STREET FAIR BUILDING
ATLANTA FT. WORTH



ARMCO Bin-Type Walls have joined up for the duration. They are standing guard to minimize the effects of blasts at vital munition and ordnance plants, storage magazines or wherever else high explosives are handled in noncombat areas.

These ARMCO "barricade walls" have many of the advantages of their

peace-time counterparts. They can be ready for use in a few days' time. Erection and backfilling are quickly done by unskilled labor and no expensive equipment is needed. On the economy side, ARMCO Walls can easily be salvaged or moved to a new site. The units are nestable and require relatively little space for transporta-

tion or storage.

Keep Armco Bin-Type Retaining Walls in mind for future use as well as important war construction. You'll find them a ready solution for unstable slopes, right-of-way, stream erosion and similar problems. Armco Drainage Products Association, 665 Curtis Street, Middletown, Ohio,

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ARMCO "barricade walls" are a war-time variation of the familiar ARMCO Bin-Type Retaining Wall. Instead of being set on a slope or batter these earth-filled bins are creeted vertically.

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### BUCKETS CAN BE BOTTLENECK

CONSULT YOUR DEALER to keep your Blaw-Knox Buckets in good operating condition

Keep your buckets handling more materialdoing more digging. Your nearby Blaw-Knox dealer is trained to diagnose bucket ills. Let him inspect yours today! The life of your bucket can be prolonged.

### COAST TO COAST SERVICE ALABAMA

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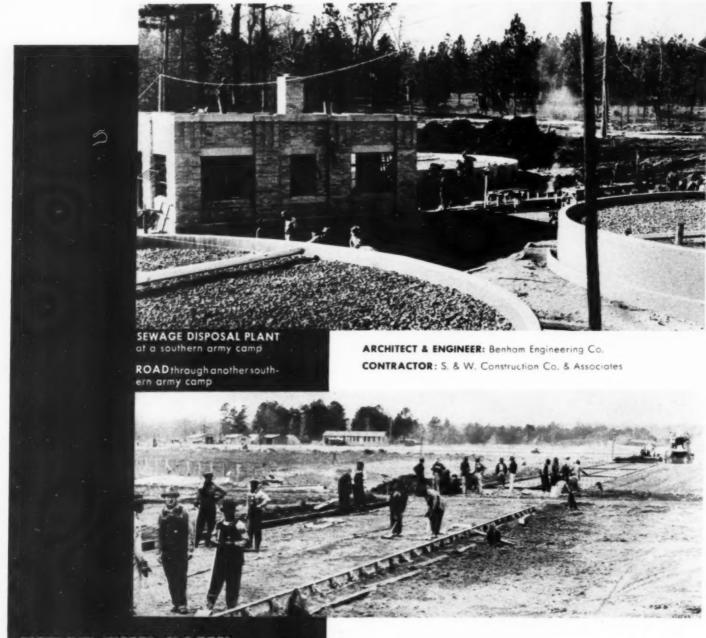
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Conley Lott Nichols Machinery Co R B Everett & Company Cochran Equip Co , Houston, Texas Dallas Conley-Lot Houston F San Antonio, Cochran Equ

ton Tractor & Equipment Corr Hunter Tractor & Machinery Co





FIRST THE CAMP. THEN THE SOLDIER .... THEN THE VICTORY:... 公

Strength Cement in so much war construction. Concrete for foundations, runways, roads, buildings is ready for service in 1/3 to 1/5 the normal time; sometimes even overnight. Our pictures were taken at two southern army camps, where Lehigh Early Strength Cement helped get the roads ready quicker, and a sewage disposal plant more promptly on its health-protecting job.

The use of Lehigh Early Strength Cement completely upsets the saying that "haste makes waste." for the quicker-service concrete that it produces is literally a denser, better concrete . . . and as valuable in peacetime as today. The Lehigh Service Department will gladly give you further information, on request.

Time, it seems, has become the biggest 4-letter word in our language. With enough time, we win; with the time well used, we win quicker.

That, actually, is what is behind the use of Lehigh Early

### Lehigh EARLY STRENGTH CEMENT

for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY . ALLENTOWN, PA. . CHICAGO, ILL . SPOKANE, WASH.

Page 34 - CONSTRUCTION METHODS - July 1942



### PROTECTING WIRE ROPE AGAINST CORROSION



This is Number 11 in a series of informative articles prepared by Macwhyte Wire Rope Company. The purpose of this series is to help wire rope users in these critical times to get the longest possible service from present ropes . . . through making useful facts on rope care more widely known.

The preceding article, No. 10 in this series, pointed out the causes of wire rope corrosion, where and when it was likely to strike. This article, No. 11, tells how to guard against corrosion. This and the previous ten articles in the series is available on request on your company letterhead.

### Lubrication...its importance

No way has yet been found to remove the "causes" of corrosion. However, there is a method of protecting wire rope against corrosive elements . . . against atmosphere, weathering, or special conditions which subject the rope to either acid or alkaline substances.

That method is . . . thorough lubrication.

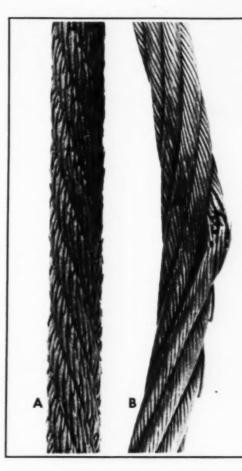
A recent and good illustration of such protective practice is found in the automotive industry. When car makers turned their plants into war production centers they ripped out massive automobile dies and machines worth millions, carted them to parking lots for the duration. When peace comes, back to work they will go.

Meanwhile these machines and dies are being protected against corrosion by a thick coating of grease.

Wire ropes, too, are machines. When in use (and more so when inactive) their parts need the protection good lubrication gives. Only when protected by lubrication (which retards corrosion) will they give the best possible service. Today, when we must all conserve what we have, such protection is doubly important.

Corrosion starts as soon as wires and strands are exposed to the elements and usually starts before one is aware of it.

In its early stages, corrosion is difficult to detect. The first signs are general discoloration of the wires of the rope. As corrosion progresses, the wires will become either pitted or covered with a reddish brown substance depending upon whether the corrosion is of an acid or alkaline type.



### To prevent such destruction...

### LUBRICATE

Destruction came to these wire ropes much too soon. It might have been prevented. At an early inspection periodic lubrication would have added countless hours to the service life of these ropes.

This sample, in addition to showing evidence of wear, is very badly corroded due to having been subjected to corroding conditions of an alkaline nature.

B Lack of lubrication caused the wires in this rope to become rust-bound. Fractures of this character occur when suddenly picking up the load or when the rope is flexed over the sheave, because the rust-bound wires cannot properly slide by each other. Notice the wires show very little evidence of wear.

### **Curb Corrosion and Conserve Steel**

Corrosion is like an incurable disease which creeps up on a person gradually. You may check the damage it is doing, but you can never repair the damage done. Eventually it leads to early death of a rope whose service life could have been so much longer ... with ordinary care.

Today corrosion is a very real enemy, destroying vital material (steel) needed for victory. If you inspect your ropes regularly, and apply lubricants freely, frequently, you are doing your bit to defeat this wire rope saboteur and get maximum service from your wire rope.

If you have further questions on corrosion (or any wire rope problems) feel free to write us about them. Simply address Macwhyte Company, 2940 Fourteenth Avenue, Kenosha, Wisconsin. Please write on your company letterhead.



Macwhyte's premier wire rope, famous for its strength, toughness, and internal lubrication Made by

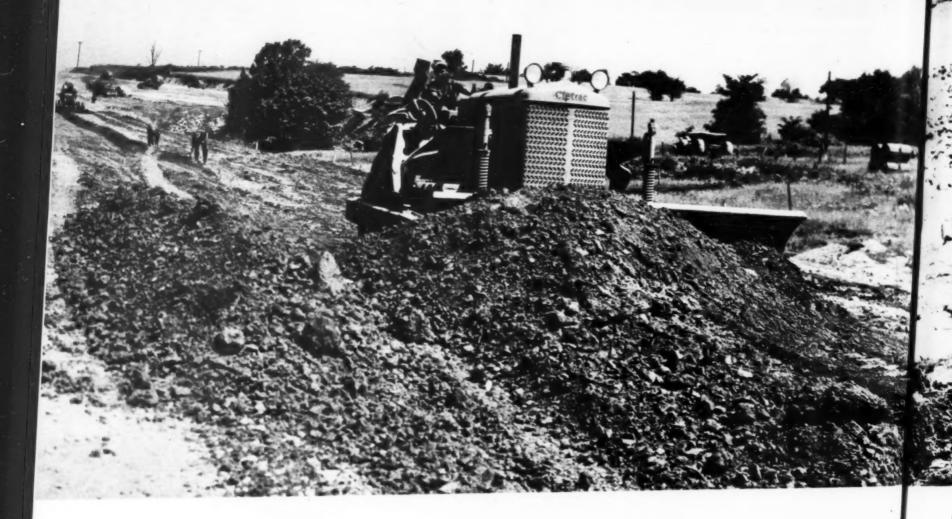
### MACWHYTE COMPANY 2940 Fourteenth Avenue . Kenosha, Wisconsin

New York • Pittsburgh • Chicago Ft. Worth • Portland • Seattle • San Francisco Distributors throughout the U. S. A.

Macwhyte Company Manufactures:

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Cable
MACWHYTE Braided Wire Rope Slings
MACWHYTE Cables, Tie Rods, Terminals, for

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Today Cletrac owners have more reason than ever before to be thankful that their tractors are engineered and built to keep running. Because our armed forces have first call on Cletrac's Production, we suggest that you keep your present tractors in first class shape by regular

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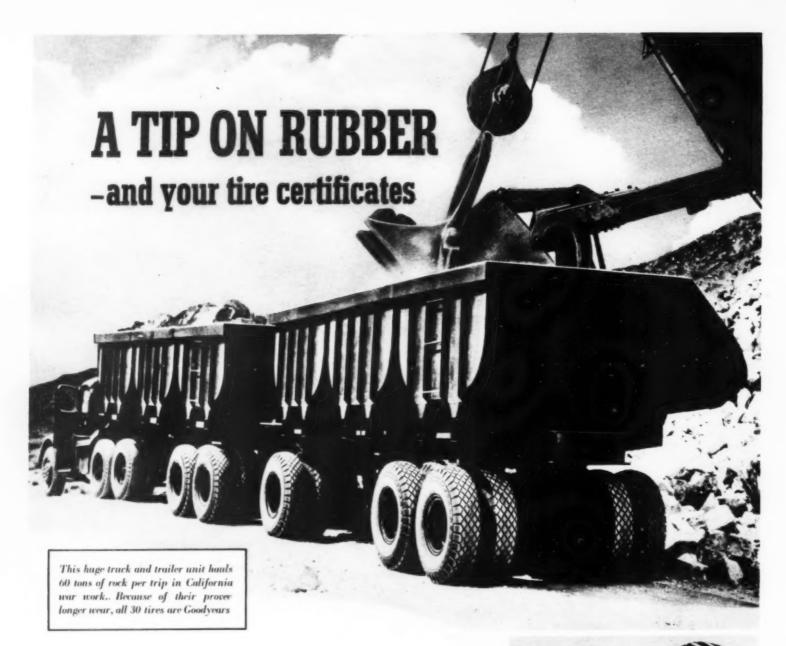
Keep Them Kunning



check ups with your Cletrac dealer. You will find him ready and willing to assist you. He has factory trained service men who know their business, and a parts stock to take care of your repairs.

Cletrac Crawler Tractors — 18 to 96 H.P.
ECLEVELAND TRACTOR COMPANY

CLEVELAND, OHIO



THE rubber shortage is far more acute than most people realize. That's why it is imperative to get none but the longest-wearing tires — tires built sturdy enough to take one or more recaps when the original tread finally wears away.

Do tires differ greatly in this respect? America's contractors answer "Yes" and back up their words by hauling more tons on Goodyear tires than on any other kind.

The reason is simply that their mileage records prove Goodyears go farther—both before and after retreading. And beyond this, they find Goodyears give them better traction with special treads designed for rock, mud or dirt operations.

Be guided by this experience. Next time you are certified to buy tires, get Goodyears and see how much less they cost you per ton-mile. HARD ROCK LUG



GOODYEAR
SURE-GRIP
GRADER
for mud and



R Goodyear's free Truck Tire Engineering Service helps you with answers to questions on Rationing Regulations. All Goodyear dealers can also arrange for retreading all sizes of off-the-road tires by factory methods that insure maximum extra service.

GOOD YEAR TIRES

ALL-WEATHER EARTH MOVER

for drawn



All-Weather ... T.M. The Goodyear Tire & Rubber Company

MORE TONS ARE HAULED ON GOODYEAR

TRUCK TIRES THAN ON ANY OTHER KIND

# Construction Methods

ROBERT K. TOMLIN. Editor

Volume 24

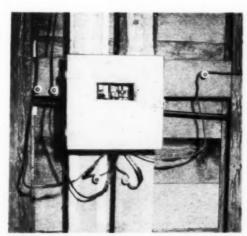
JULY, 1942

Number 7

### Electric Eye

### Controls Muck Trains In Continental Divide Tunnel

A PHOTOELECTRIC block signal system is helping to rush to completion the 13-mi.-long Continental Divide Tunnel being drilled between Grand Lake and Estes Park, Colo., by speeding the traffic of men and materials which constantly flows in both directions in this tunnel. The muck trains in the tunnel travel on a 24-in.-gage single track, with passing tracks at convenient intervals. The function of the signal system, designed by General Electric Co. engineers under the guidance of J. A. Setter, industrial control specialist, is to indicate to train crews the presence of a



CLOSEUP OF ELECTRIC EYE as installed in case



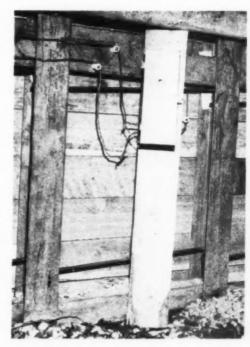
PHOTOELECTRIC RELAY with two light sources operates red and green signal lights of block system as muck train passes through Continental Divide Tunnel on 24-in-gage single track, with turnouts

train in the next section of the tunnel. In addition to preventing accidents, it has also reduced waiting time at passing tracks and has greatly increased the efficiency of all hauling operations. Because water and dirt would tend to make maintenance costs soar, and because it is necessary to keep electric currents out of the rails to prevent premature ignition of blasting charges, the signal system is designed without mechanical or electrical switches connected to the rails.

The track was divided into blocks of about 6,000 ft., each block ending whereever a turnout occurs for passing. At the beginning and end of each block were placed two G-E photoelectric relays, spaced about 30 ft. apart. The relays control the operation of red and green signal lights in that block. Each relay has two light sources located across the track, and spaced about 15 ft. apart so that only a locomotive or train can operate the lights.

All the green lights are on when the track in a block is clear. When a train

(Continued on page 106)



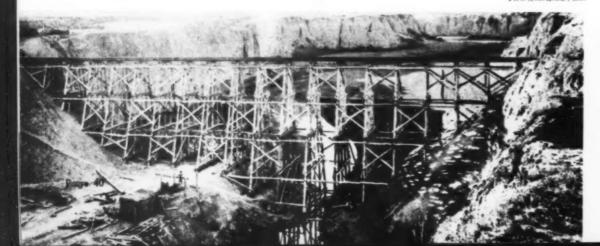
**LIGHT SOURCE** is located across tunnel track from photoelectric relay. Each relay has two light sources, spaced 15 ft. apart so that only a passing locomotive or train can operate signal lights.

CANADIAN CARGO SHIPS are rushed to completion for speedy launching from war-born shipbuilding ways to join convoys carrying supplies to distant battle fronts. Hull assembly goes ahead on this ship while high tide dampens stern plates.



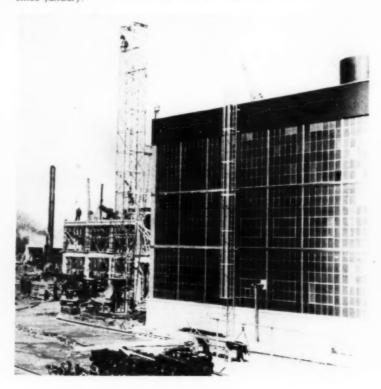
LIBYAN RAILROAD advances rapidly over desert sands as New Zealanders and Indian Corps break records in laying track to supply United Nations' forces opposing Axis panzer units.

TIMBER TRESTLE IN CHINA (below), where steel is scarce, carries railroad across wide river bed on new line being constructed in parthwest part of country.



# THIS MONTH'S NEWS REEL

PLANT EXPANSION (below), of Westinghouse Merchant Marine Works to produce even greater volume of propulsion machinery for Maritime Commission war cargo ships, follows quickly upon completion of original plant, which has been making turbine parts and speed reduction gears since lanuary



100 ACRES OF FLOOR SPACE (below), will be inclosed in War Department office building in Arlington, Va., across Potomac River from Washington, D. C. Pentagonal in shape, with five sides, or wings, surrounding an open court, building is reinforced-concrete structure three and four stories high requiring 450,000 cu yd. of concrete Each wing measures 321 to





**WOMEN WELDERS** are graduated from welding school of Oregon Shipbuilding Co., Portland, Ore., and start to work on production of cargo ships for U. S. Maritime Commission. They symbolize national trend in training women substitutes for male workers called into military service



FIVE WEEKS AHEAD OF SCHEDULE, new blast furnace of Republic Steel Corp. goes into production somewhere in Southeast just 119 days after first piece of steel was erected. Furnace towering 130 ft. above ground will help overcome shortage of scrap steel by supplying pig iron for open hearth units.

faced with limestone, and 361 ft. along inside wall, finished with exposed architectural concrete. Contractor combination made up of John McShain, Inc., Philadelphia, and Doyle & Russell and Wise Contracting Co., Inc., both of Richmond, Va., places 3,000 yd. of concrete per day under direction of Corps of Engineers, U. S. Army.





GLUED, LAMINATED WOOD ARCHES of 152-ft, span and 35-ft, rise form frame of new Northwest Airlines hangar at Fargo, N. D., designed by Karl O. Larson, chief engineer, to accommodate 40-passenger planes projected for future use. Arches are three-hinged design, fabricated by Unit Structures, Inc., Peshtigo, Wis., and shipped in halves on flat cars.

CAPSIZED LINER "NORMANDIE" (below), gutted by fire at New York pier, Feb. 10, while being converted to troopship "Lafayette", is cleared of three upper decks as first step in salvage operations by which Navy Department proposes to refloat ship. Special committee appointed by Navy Department recommended controlled pumping as most practical salvage method, no estimate was made of time required.





CONCRETE FOUNDATION WALL AND PIERS along south side of existing machine shop building to be underpinned is exposed by excavation for plant addition alongside.

# Underpinning Holds Shop Wall As Plant Addition

SMALL JOB DETAILS that Illustrate underpinning and pile-driving technique

Is Built Alongside





MUCKING OUT of 14-in. o.d. steel cylinder is done with two types of tool. In clay flat helical earth auger (right) is used. In sand and gravel material is removed by midget orange-peel bucket (left) which has diameter of only 12 in. with leaves extended.

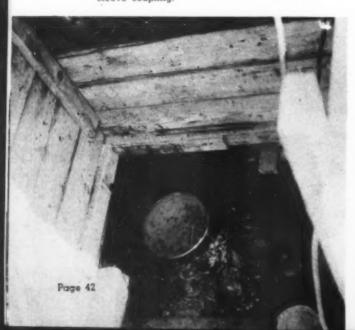


**APPROACH PIT** measuring 31/2x4 ft. in plan and 5 ft. deep is excavated and extended 2 ft. under concrete footing to be underpinned. Pit is sheeted with 2x8-in. planks.

JACKED DOWN (below) to bottom of approach pit, section of steel cylinder is ready to be mucked out before next 5-ft. section of casing is joined to it by sleeve coupling.

**IRON BALL (below)** sliding on shaft above midget bucket can be raised and dropped to force leaves of bucket into sand or gravel to obtain good "bite."

HYDRAULIC PRESSURE (below) is applied through copper tubing to 50-ton jacks by hand pump equipped with gage.









SECTION OF STEEL CYLINDER is set in approach pit and forced into ground by hydraulic jack reacting against steel plate on under side of building footing. Base of jack rests on steel plate on top of 14-in. o.d. steel cylinder.

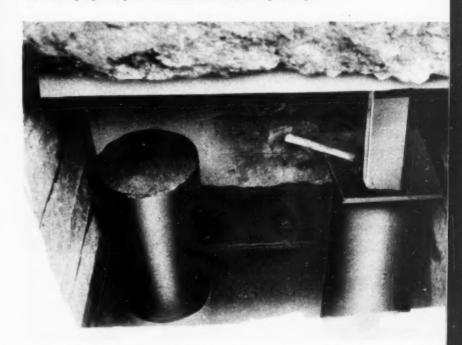
UNDERPINNING OF THE SOUTH FOUNDATION WALL of a 2-story machine shop in Long Island City, N. Y. which is engaged in the production of urgently needed war materials, was required before a 50x85-ft. addition could be built along-side the existing 96x185-ft. shop to increase plant capacity. Excavation for the basement of the new structure had to be carried down 6 ft. below the elevation of adjacent footings, so that additional support was required to insure the safety of the main shop building, a steel frame structure with brick curtain walls, concrete foundation walls and spread footings. This support took the form of pairs of sectional steel cylinders, jacked down under existing footings, filled with concrete and pretested to support 40-ton loads on each pile. The underpinning operations were carried on without interrupting normal production in the machine shop, and involved

COMPLETED UNDERPINNING (below) in one pit shows pair of cylinders with steel I-beam wedging posts placed to transmit building load to steel plates on cylinder tops. Wedging posts are later encased in concrete and pit is backfilled.



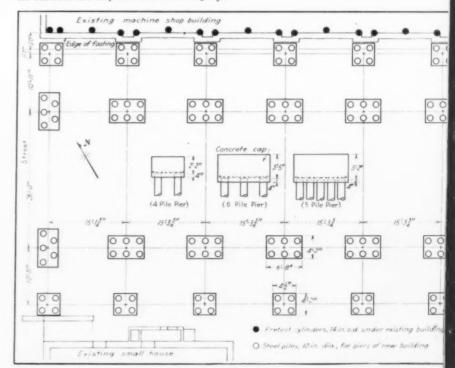


**TEST LOAD**, generally exceeding working load by 50 percent, is applied to concrete-filled cylinder by pair of hydraulic jacks seated on steel plate and reacting against plate on under side of building footing.



CONCRETE-FILLED CYLINDER at left is ready for application of test load. Cylinder at right has been pretested, jacks have been removed and foundation load has been transferred to it by wedging steel I-beam, set on end, against under side of footing.

**GROUND PLAN (below)** shows location of pretested steel cylinder underpinning for wall of existing machine shop and concrete-filled steel piles for substructure of plant addition alongside.





CONCRETING OF STEEL PILE CYLINDERS and caps is done with transit-mix chuted to place in area to be occupied by plant addition. At extreme left is underpinned wall of existing machine shop.

FOR UNDERPINNING CONTRACTORS (right). Spencer. White & Prentis Inc. GEORGE F. FLAY IR (left) served as engineer and MARIO CANALE as job superintendent.



the jacking down of 17 sectional steel cylinders, located as shown on the accompanying plan.

The material at the site, starting at ground level, consists of a 4- to 8-ft. layer of miscellaneous fill underlaid successively by silty clay, clay, fine sand, coarse sand and gravel in which boulders are occasionally encountered. The existing machine shop structure (2 stories, without basement) has concrete foundations extending about 10 ft. below ground level, while the footings for the new plant addition, (2 stories, with basement) located alongside and only about 3 ft. distant from the present building, extend to a depth of about 16 ft.

The job was done by Spencer, White & Prentis, Inc., engineers and contractors, of New York, using the Pretest method of underpinning which provides support for the foundation on concrete-filled sectional steel cylinders, installed by the jacking, test loading and load transfer procedure described in the following notes and illustrated in the accompanying photographs.

### **Jacking and Mucking Cylinders**

After excavating alongside the existing building to expose its concrete foundation wall and footings, the first step in the underpinning sequence consists of digging with hand shovels alongside the footing to be underpinned an approach pit,  $3\frac{1}{2}x4$  ft. in plan and 5 ft. deep, to accommodate two piles. This pit is extended 2 ft. under the footing to be underpinned, and is sheeted with 2x8-in. planks placed horizontally. In the bottom of the pit and directly beneath the

FOOTING CONTAINING FOUR PILES (left) is being concreted within sheeted pit which forms pile cap. Concrete has risen almost to tops of two piles. Anchor bolts are suspended over forms for embedding as concrete rises to finished height.

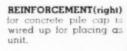


**PILE DRIVER** operating on heavy timber mats is powered by steam to operate hammer in 50-ft-long leads.

footing a hole about  $1^4\,_2$  ft. deep is dug, and in it is set a 5-ft. length of 14-in. o.d. steel cylinder, accurately plumbed and held vertical by 2x4-in. bracing, ready for jacking down into the ground. Upon the top of this steel shell is placed a steel plate about 18 in. square and  $^34$  in. thick which serves as a base for a 50-ton hydraulic jack. These jacks are Watson-Stillman units, with an overall height of about 20 in., a ram diameter of  $4^{1/2}$  in., a lift of  $10^{1/2}$  in. and a weight of 175 lb.

With the jack in position, hydraulic pressure is applied through flexible copper tubing, and the ram of the jack, reacting against a steel plate on the under side of the concrete footing of the building, forces the steel cylinder into the ground. After the first shove of about 10 in., the ram of the jack is retracted, blocking in the form of a steel section of 6-in. H-beam, 10 in. high, is placed on top of the jack and the operation repeated in 10-in. stages, with successive additions

(Continued on page 112)

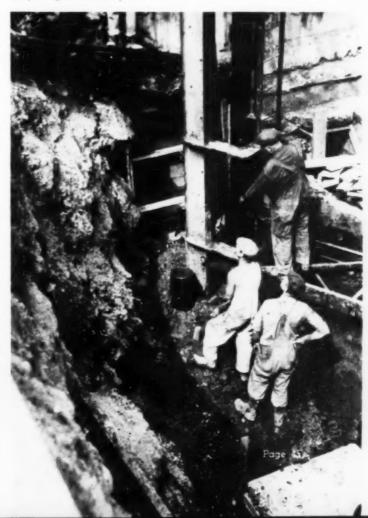


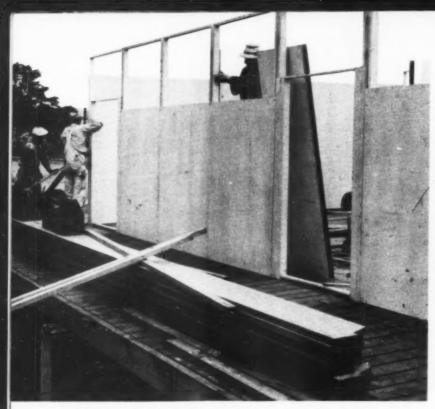




**CLOSE QUARTERS** are encountered in driving piles near corner of existing shop building, which has been underpinned.

**DRIVEN TO PENETRATION** of 11 to 16 ft., top of 10-m-diameter steel pile cylinder (**below**) appears at left of leads as boom of driving rig is shifted for putting down new pile.





**ERECTING WALL PANELS** of transom-sash type is speedy operation Piled in foreground are precut ceiling joists.

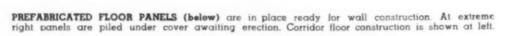


**PLYWOOD FACING** is applied to both sides of wall panels. Note provision for exposed roof joists at top of mullions.

**TIMBER FLOOR GIRDERS** of  $4 \times 10^{-}$  in size are centered on concrete piers by steel dowel anchor rods and provide support for prefabricated floor panels of plywood.

# Prefabricated Plywood Panels

Form Floors and Walls of Low-Cost School Buildings On Defense Housing Projects



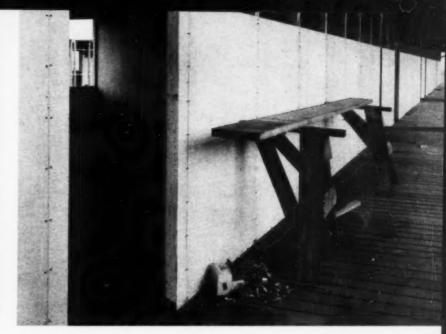


STORY TO STORY

of timber framing and built-up plywood panels in standard sizes were responsible for lowering the cost of two onestory schools on defense housing projects in California, to only \$3.50 per sq. ft., claimed to represent a reduction of 45 percent in the cost of structures of this class built according to conventional designs. Of identical types, the two schools have respectively, 23 and 26 classrooms and domed-roof auditoriums 56x80 ft. and 56x96 ft. in plan. Their construction was completed in 90 days. In these days of building material shortages, the one-story design adopted made



TYPICAL CLASSROOM shows window construction and plywood surface of flooring panels.

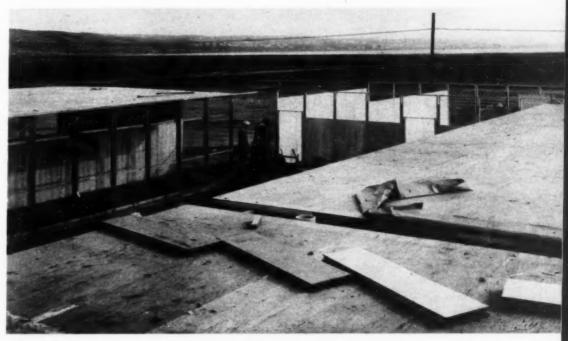


WALL PANELS are prefabricated in three sizes: low panels under windows; full-height panels, in partitions; and panels topped by transom-type windows. Corridor in form of walkway, open on one side, appears at right and leads to washroom.

it possible to obtain an ample supply of framing lumber in the size ranges required.

The buildings are supported by piers built without the use of any forms by digging holes 5 ft. deep and 10 in. in diameter with post-hole augers and filling them with concrete in the top of which a 5/8-in. steel reinforcing rod is embedded to serve as a dowel for centering and anchoring the timber floor girders. The piers are topped off with square concrete caps. The concrete piers are located on an 8x11-ft. rectangular spacing plan. The girders are 3x8-in. and 4x10-in. timbers of 11-ft. span, producing an economical layout for the 22x40-ft. classrooms. Between the floor panels and the girders at each pier are 5/8-in. plywood gussets that provide bracing against laterial movement.

The flooring carried by the girders consists of 4x8-ft. panels surfaced with



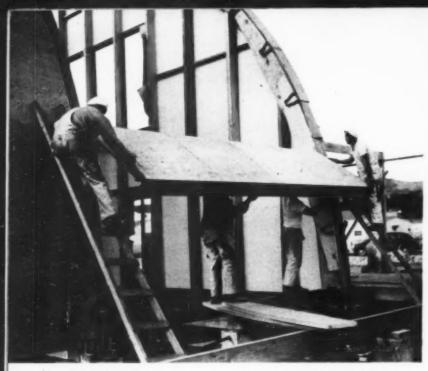
ROOF PANELS are in place but roofing is yet to be put on. Panels lying in foreground are to close opening over space between classroom end-walls provided for firebreak and utilities.

FOUNDATION (below) is ready for 56x96-ft. auditorium in which floor construction is same as in classrooms. Note plywood gussets on floor girders for increasing resistance to lateral movement.

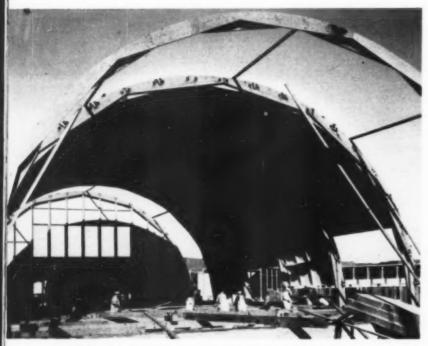


SEMICIRCULAR RIBS (below) of laminated timber were erected on 16-ft, centers for auditorium. In foreground, rib is assembled in horizontal position ready for erection.

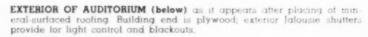


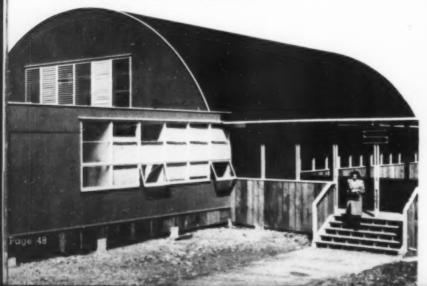


JOIST HANGERS on arches greatly facilitated placing 4x16-ft. built-up rool panels for auditorium.



ARCHED ROOF takes form on laminated timber ribs for school auditorium







AUDITORIUM INTERIOR is finished merely by painting under sides of

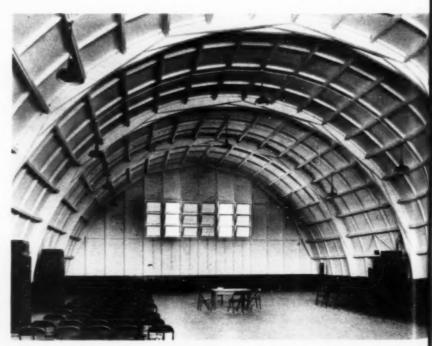
\*a-in.-thick sheets of plywood, made up at the mill to expedite erection. Built to exact specifications, these floor panels are brought to the job, dropped into place and spiked through the side-frame members to adjoining units. In addition to those for the floor, panels of two other types for walls and roof are prefabricated at the mill. To conserve metal all panels are made up with glue instead of using nails.

Domed roofs carried by timber arches spaced on 16-ft. centers cover the 56x80-ft. and the 56x96-ft. auditoriums for the two school buildings. Their construction involved the use of built-up plywood panels measuring 4x16 ft., shaped to the curve of the roof arch.

Both schools have corridors, open on one side, which extend as covered walkways to washrooms at one end of each building.

Plans for both school projects were prepared by Franklin & Kump and Associates, architects, of San Francisco. William Wilson Wurster served as consulting architect.

On one of these schools the contract was held by the Midstate Construction Co., Fresno, Calif.; the other was built by a combination including the Midstate Construction Co. and the Harris Construction Co.



**AUDITORIUM CONSTRUCTION** is partially completed. Temporary cleats on surface made roof accessible for workmen.

Huge

Steel Pins

Make Closure of

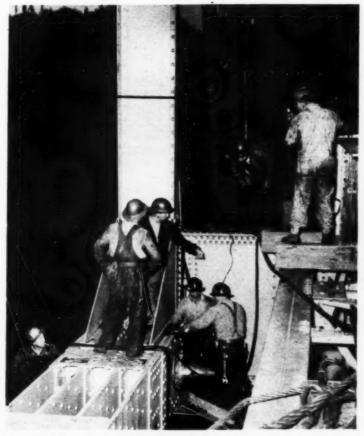
Cantilever Arms On

Pit River

Bridge



**RAMMING HOME HUGE STEEL PIN.** measuring 22 in. in diameter and weighing several tons, riggers of American Bridge Co., working with length of steel rail 500 ft. above river, make closure of cantilever arms of Pit River bridge.



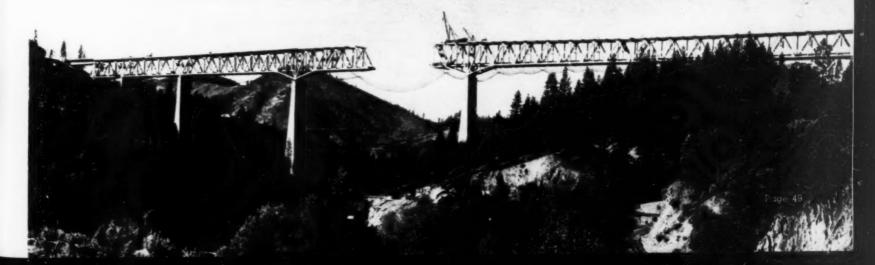
CLOSURE OF CANTILEVER ARMS of bridge is completed as last steel pin is driven into place on double-deck steel structure high above Pit River.

AT AN ELEVATION OF 500 FT. ABOVE WATER LEVEL steel riggers drove into place giant connecting pins, 22 in. in diameter and weighing several tons, to complete closure of the two huge cantilever arms of the Pit River bridge, which was placed in service March 15 by the U.S. Bureau of Reclamation as part of the 30-mi. railroad relocation around the area to be occupied by Shasta reservoir in California, as described in the June issue (p. 46). Riveters then finished the joints on the central span of the structure, which is the highest double-deck bridge in the world. Details of the closure operation are shown in the accompanying photographs.

Built by the American Bridge Co., the bridge carries two railroad tracks on the lower deck and a four-lane concrete-paved section of U.S. Highway 99 on the upper deck across the deep Pit River Canyon 14 mi. north of Redding, Calif. The canyon will become an arm of the lake after Shasta Dam is completed across the Sacramento River about 8 mi. downstream from the bridge. The Pit River runs into the Sacramento 5 mi. above Shasta Dam.

Construction of the Pit River bridge piers by the Union Paving Co., of San Francisco, was started in November, 1939, and the first steel was placed for the superstructure in December, 1940. Supported by towering concrete piers of record height, the heavy steel spans were erected from both sides of the canyon. The bridge has an overall length of 3,588 ft., including short highway approach viaducts on either side.

NEARING POINT OF CLOSURE (below) cantilever arms of bridge extend out from skyscraper concrete piers 500 ft. above river. Steel riggers and riveters are protected from fatal falls by safety nets hung below steelwork.



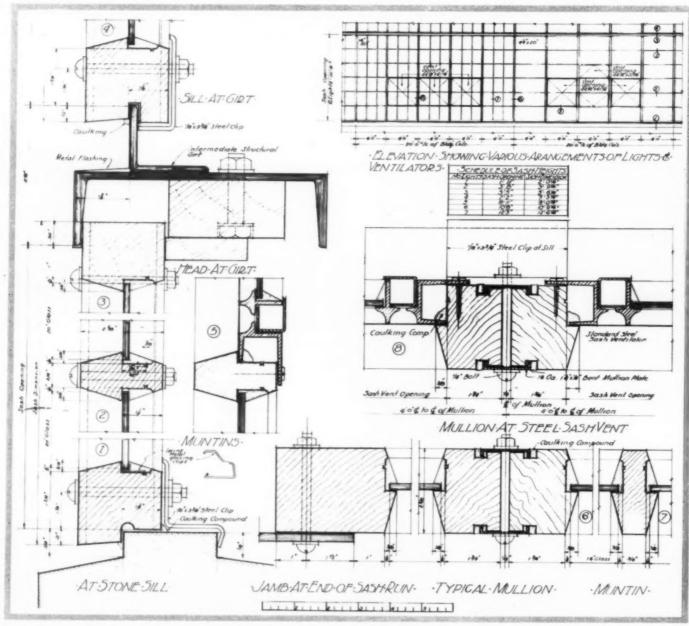
### New Window Sash

# For Industrial Buildings Saves Steel by Use of Wood

with the Government's restriction of the use of steel, needed for war production, an entirely new type of wood sash has been developed by a member of the firm of Albert Kahn Associated Architects & Engineers, Inc., of Detroit, which will serve for industrial and other buildings in place of standard steel sash. John Schurman, its designer, and the Albert Kahn organization have waived all patent rights to the development. Full advantage was taken of experience gained in the development of steel sash, with its simple frame and mullion construction and its compact ventilators, all built up at the factory in standard units. The extreme heights possible in single units mean considerable saving in hori(Continued on page 108)



VICTORY SASH, made largely of wood in order to conserve steel for war uses, is inspected by its originator, JOHN SCHURMAN (right) and ALBERT KAHN head of Detroit architectural and engineering firm that bears his name.



STRUCTURAL DETAILS of new type of window sash for industrial buildings for which all patent rights have been waived by Albert Kahn organization to aid war effort.



**THE FOURTEENTH ANNUAL AWARDS** for the most beautiful bridges built of steel during 1941 were announced May 11 by the American Institute of Steel Construction as follows:

Most beautiful monumental bridge: Rainbow Bridge over Niagara River at Niagara Falls, N. Y.

Most beautiful small bridge: Fairmount Boulevard Bridge, Cuyahoga County, Ohio.

Most beautiful movable bridge: Passaic River Bridge, Kearny, N. J.
The Jury withheld an award to the

Beautiful
Bridges
Receive Awards From
American Institute of
Steel Construction

most beautiful bridge of medium size. Only steel bridges which had been completed and opened to traffic during the calendar year 1941 were eligible to compete.

For purposes of classification all bridges costing \$1,000,000 or more were grouped in Class A; bridges costing less than \$1,000,000 but more than \$250,000 to build were grouped in Class B; bridges costing less than \$250,000 were grouped in Class C; and all movable bridges were placed in a

(Continued on page 108



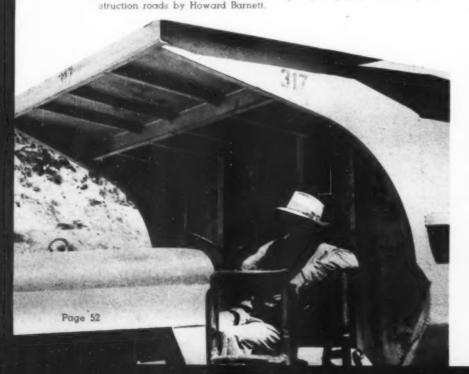
FAIRMOUNT BOULEVARD BRIDGE in Cuyahoga County, Ohio, receives Class C award for small bridges costing less than \$250,000



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JACKHAMMER OPERATOR Jack O'Brien drills hole for dynamite blast high on west abutment of Shasta Dam.

### DUMP TRUCK (below) of 25-cu.yd, capacity is piloted over rough construction roads by Howard Barnett.



## On Construction's

Many Different Types of
Craftsmen Are Rushing
Completion of Shasta Dam
to Supply Electric Power
for War Program



LOOKING LIKE "MAN FROM MARS." unidentified welder repairs giant dragline bucket used to excavate gravel from aggregate pit.

CONNECTING VALVE (below) to grouting pipe extending into foundation of damsite is job of Pete Mercendetti.



## ns Front Line

POWER AND MORE POWER is one of the critical needs of the war program, and the men here pictured are working to increase America's supply of electric energy. They are the builders of Shasta Dam, mighty bulwark of concrete and steel being completed in California for U. S. Bureau of Reclamation by Pacific Constructors, Inc., to check the ravages of the Sacramento River and put its waters to work in the Central Valley project. The pictures, taken by the Bureau of Reclamation's photographer "Tex" Gibson, show some of the many different craftsmen required in the construction of a great dam.



ON RECEIVING END OF SIGNAL LINE, high in head tower, is "Hap" Happner handling controls of one of great cableways.



CABLEWAY SIGNALMAN, Ed "Whitey" Sherman, directs movement of one of big buckets of concrete. He communicates with cableway operator by telephone or short-wave radio.



FRIGHTENING CONTRAPTION on Henry Irwin's face is dust mask worn in bulk-cement depot.



**ELECTRICIAN,** W. A. Miller, takes time out for lunch to fortify himself for hard afternoon's work.

PERCHED ON A HIGHLINE (below) stretching across Sacramento River Canyon, Harold Shoneman is inspecting a section of cable.





# On-the-Job Maintenance EXTENDS SERVICE LIFE OF CONSTRUCTION HOSE

DON'T LET THIS HAPPEN TO YOU!

RUBBER

By JAMES E. MACDONALD, Jr., Vice-President, Goodall Rubber Co., Inc., Philadelphia; Pa.

ENGINEERS OF HOSE MANUFACTURING COMPANIES through the years have designed various constructions of hose to withstand the severe service conditions encountered on construction work. Today these various types, built to high standards of quality, are no longer procurable, because of government restrictions on the use of rubber, fabric and chemical component parts. Rubber manufacturers now are making the best products they can with the materials which are available.

Government regulations have restricted the use of crude rubber in practically all products. Requirements of the armed forces for cotton duck fabrics have radically changed the fabric constructions for various hose products. It is our patriotic duty, therefore, to lend every effort to conserve all rubber products.

There is a definitely limited quantity of crude and reclaimed rubber in our government stockpile. There will not be any more until the war is over and possibly for some time thereafter, because of conditions in the Far East. Synthetic rubber production will not come in sufficient volume to take care of essential needs until 1944. Thus, any safeguards you may take to prolong the life of hose and other rubber products will release rubber from the stockpile for the highly essential uses of the armed forces.

What can the construction industry do to conserve rubber? First of all, it is important for the construction operator to remember that he is not getting the old reliable qualities. Present hose constructions won't stand the gaff that old friends were able to take. It is important, therefore, to keep an eye on how these products are being handled.

### Hose Abuse

One day we were watching a road mixer shuttling back and forth laying several layers of concrete mix on a highway project. During the few minutes we watched, we saw the water hose take the worst beating imaginable. As the mixer moved back and forth, loops formed in the hose. These loops would be contracted into tight kinks, then twisted out.

When the mixer moved up to the next segment, it dragged about 150 ft. of hose by the coupling at the intake pipe. To top off these abuses, the trucks hauling batches to the mixer would repeatedly back over the hose in turning around. Accompanying photos show the unnecessarily hard usage given the water hose through thoughtlessness on this job.

Now, the hose didn't fail that day. It probably stood up for quite a while. But every kink, every strain at the coupling and every crushing truck wheel was breaking down tiny fibers in the duck wall and shortening the life of the fabric. That hose probably was burned for scrap long before its time. And, how we need that wasted rubber today!

### Safeguard Hose

Suction hose takes a beating on some jobs. Here's the ideal way to treat it: Set the pump well back from the edge of the pit to let the suction hose take a gradual bend from the pump intake to the edge of the bank. Pump pulsations cause the hose to vibrate. This vibration causes the hose cover to wear through at points of contact with rough surfaces and rocks. By placing soft pads of burlap under the hose, wherever it lies on sharp edges or rocks, you will insure maximum life for this vital rubber protection on your suction hose.

Guarding against cuts and excessive abrasion on the cover of any hose cannot be too strongly stressed. You might say, "Oh, that cut is only 1/16 in. deep. The rest of the hose wall is % in. thick. That's a long way to go before she blows."

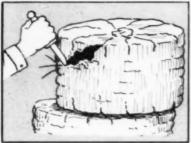
But the fact is, a cut in the cover is just like a cut in your skin. The way is open for infection to enter and travel through the blood stream. With hose, the way is open for moisture and oil to enter the carcass and soak it like a wick. The cords eventually rot and fail, sometimes at quite

(Continued on page 103)

### DONT'S FOR HOSE HANDLING



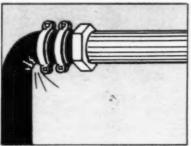
when unloading hose.

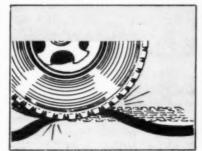


DON'T USE grab hooks or chains DON'T CUT PACKAGE open with knife when unwrapping hose.

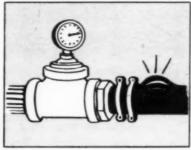


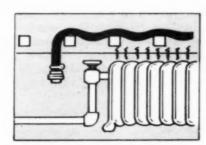
DON'T DRIVE COUPLINGS into hose DON'T PERMIT sheer drops or angle bends in hose. or burrs.



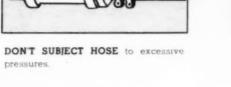


DON'T LET HOSE be run over by

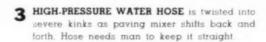


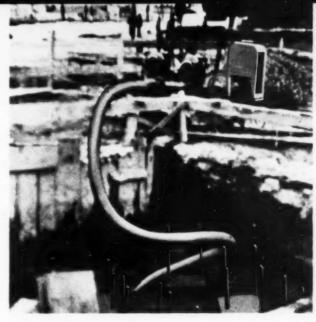


DON'T PLACE HOSE where it may be attacked by excessive heat, moisture or electrical discharges. Don't hang hose on nails or boards.

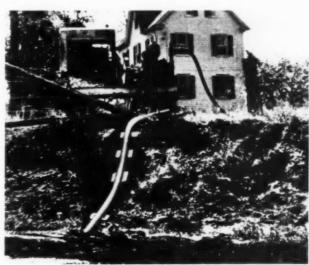


- 1 ALLOWED TO LIE in path of rolling equipment, hose frequently is crushed under pressure of vehicle wheels.
- 2 ROAD MIXER, moving ahead, drags unattended hose, imposing injurious strain adjacent to intake coupling.





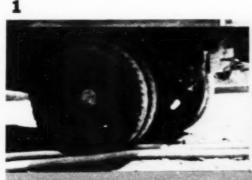
CARELESS INSTALLATION allows suction hose to drop sharply from pump and twist around reinforced rods.

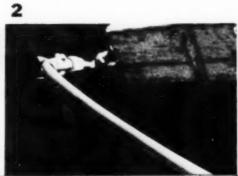


PROPERLY LAID SUCTION HOSE rests or, burlap pads which protect cover from abrasi n.



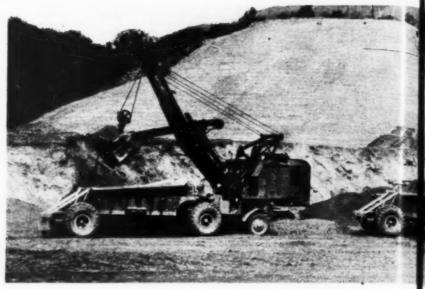
PUTTING CONSERVATION to work, this man preserves hose by picking it up and moving it with paving mixer.











**FINE MATERIAL** from Pit A,  $4\frac{1}{2}$  mi, from dam, is loaded into Euclid self-powered bottom-dump wagons by  $2\frac{1}{2}$ -cu yd. Northwest shovel.

## Three Types of Truck Deliver Fill for 12,000,000 a.

TRUCKS OF THREE TYPES — bottom-dump, end-dump and side-dump — varying in capacities from 12 to 20 cu.yd., and two types of grizzly for grading coarse material into two size classifications, are playing a major role in handling the 12,000,000 cu.yd. of fill required for Santa Fe Dam, huge structure, 92 ft. in maximum height and 23,805 ft. long on its crest, being constructed on the San Gabriel River near Los Angeles, Calif., as a U. S. Engineer Department project for flood control. With a low bid of \$8,837,200, a combination of four contractors, Morrison-Knudsen Co., Winston Bros. Co., J. F. Shea Co., Inc., and Ford J. Twaits Co., last year was awarded the contract for the dam which is scheduled for completion in December 1943.

The big fill, which in plan has the general shape of the letter U, with arms extending upstream from the main structure

across the river channel, is being placed in five "zones" with a core of about 1,000,000 cu.yd. of fine, impervious material along the center, constituting Zone 1, and material of increasing coarseness and porosity in the remaining four zones. For the core, suitable fine material was located in a borrow-pit, designated A, 4½ mi. from the damsite. A second borrow-pit, B, about 1 mi. upstream from the dam, supplies the coarser material, totaling 11,000,000 cu.yd., which is segregated by two grizzly installations into sizes greater than and less than 6 in. for the remaining zones of fill. From both borrow-pits hard-surfaced, well drained haulage roads, with upgrades limited to 2 percent, were built and maintained by the contractors to insure efficient operation of their truck fleet.

Pit Excavation and Haulage — All the materials for the more porous zones (Nos. 2, 3, 4 and 5) are being taken from







CAPACITY OF BODIES (right) is increased 2 cu yd by 9-in, increase in height of sides.



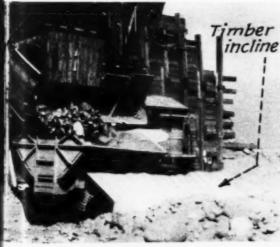
### 00tu. Yd. Santa Fe Dam . . . Grizzlies Classify Coarse Material

borrow-pit B immediately adjoining the dam on the upstream side. Here two Marion electrically-operated shovels with buckets of 4- and 6-cu.yd. capacities, respectively, excavate and load the material into 6-wheel Maxi trucks of two types: 20-cu.yd. side-dump and 12-cu.yd. end-dump. With a 90-deg. swing from the digging position, the average shovel dipper cycle is less than 1 min., and four dipper loads, totaling 16 to 25 cu. yd., are delivered to the truck in 3 to 4 min. The average output of these two shovels has been running about 7,000 cu. yd. per 8-hr. shift.

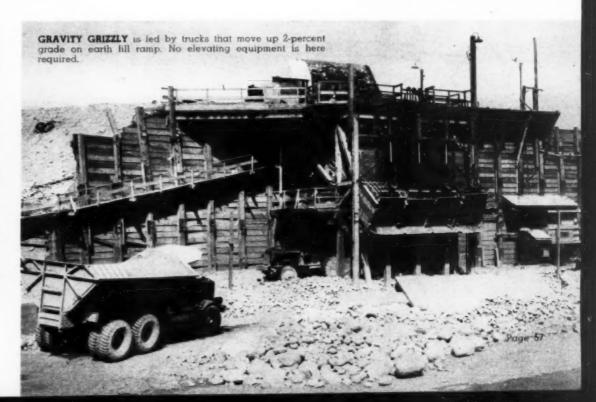
The fine material from borrow-pit A is excavated by 2½-cu.yd. Northwest power shovels and loaded into Euclid bottom-dump self-powered wagons, the normal 13-cu.yd. capacity of which is increased 2 cu. yd. by building up the body sides to an extra height of 9 in.

Earth-moving experience with truck bodies of three types on the job has indicated that bottom-dumps are speediest on the fine material, end-dumps are effective for stripping, and side-dumps are quickest in unloading at the grizzly. A side-dump unit, for example, is ready to leave the dumping platform about 4 sec. after it starts to discharge. An end-dump unit requires about 45 sec. to back into position and discharge. Truck dispatching, therefore, is managed so that units are assigned to the type of work at which they are most efficient. Trucks are assigned to the different earth-moving operations so that material arrives at the fill in a sequence that avoids interference in the various stages of placement, spreading, sprinkling and compaction. Where the core material can be kept slightly above the level of the adjoining surfaces, the trucks have a uniform pull to point of delivery.

(Continued on next page)

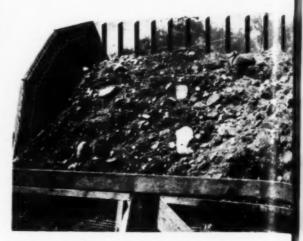


TIMBER INCLINE on near side of truck receiving load of plus-6-in material prevents spillage from falling or rolling back into roadway where it would interfere with speedy truck movement.





COARSE MATERIAL, containing no fines, is excavated by big Marion electric power shovels in borrow-pit B which will supply more than 10,000,000 cu.yd. of fill for dam. Portable towers carry electric cables serving shovels.



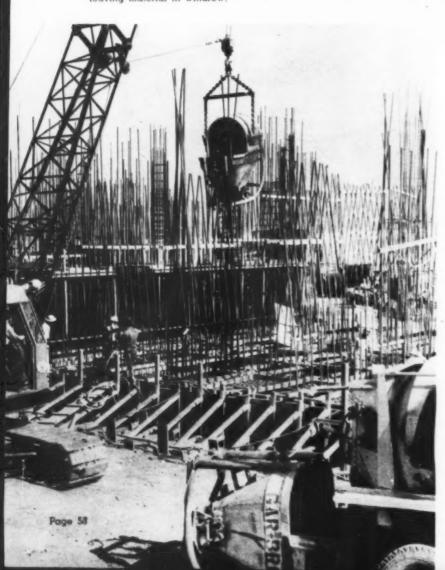
TYPICAL 20-CU.YD. LOAD of coarse material is discharged from side-dump truck body. Trucks of this type discharge their loads in 4 sec.



ON FILL IN DAM bottom-dump wagon dumps, without lessening speed leaving material in windrow.



**BOTTOM-DUMP WAGON.** immediately following one in previous picture, plows off top 2 ft. of windrow on way to end of preceding deposit where it will begin to discharge its own load. Euclid units have small "snow plow" in front and  $\frac{1}{2}$ -in. plate beneath crank case to permit of this plowing operation.



Truck bodies of the Euclid center bottom-dump type are assigned to core material deliveries because the load can be discharged without slowing down truck speed. These trucks follow one another, each straddling the windrow of fines dropped by the preceding trucks, and each lengthening the windrow by the amount of its load. Fines thus deposited are spread with a motor-patrol blade grader to an average depth of 6 in. before sprinkling and compaction. Preceded by two sprinklings and two harrowings, sheepsfoot rollers ordinarily make eight passes over each layer of the core material. The harrow is used after the sprinkling and before the rolling is done.

Although borrowpit A produces an exceptionally uniform quality of fines, a small percentage of cobbles is included. These are removed on the fill by a 4-man crew of rock pickers who toss the oversize stones turned up by harrowing and rolling into the adjacent side zones of the embankment containing the coarser material. Tests of the fine material placed in the core zone showed a weight of 132.4 lb. per cu.ft., representing an increase of 23 lb. in the weight of the same material before excavation from borrowpit A.

Segregation of the large quantity of borrow-pit B coarse material into two grades, the plus-6-in. and minus-6-in. classifications, constitutes the center of interest on this job. The

"LAY-DOWN" BUCKET (left), a development of Garlinghouse Bros., Los Angeles, is designed to facilitate loading from mixer-trucks with a load discharge end. View shows bucket being filled (in lower right corner) and being swung by crane to point of discharge.



**LOOKING DOWN ON BAR SCREEN** of grizzly; anchor chains hung to prevent rebound are not in use. Bar spacing widens toward lower end to prevent wedging of rock.



MOTOR PATROL BLADE GRADER, Austin-Western machine, spreads fines in impervious core zone of dam to thickness of 6 in. before compaction.

segregation is done by two grizzlies of different types, designed for (1) mechanical and (2) gravity delivery.

The mechanical grizzly elevates the pit-run material on a 60-in. rubber conveyor belt (275 ft. between pulleys, 200-hp. motor) from a loading station built below ground. The underground station allows trucks to discharge from ground level and a 72-in. pan feeder delivers the material uniformly to the conveyor. At the delivery end of the belt the material discharges on two heavy-duty stationary bar screens set at an angle of 28 deg. with the horizontal. The minus-6-in. material falls between the bars into a bunker beneath and the plus-6-in. passes over the tops of the bars into another bunker. Both bunkers are elevated enough to permit trucks delivering to the fill to drive, at ground level, beneath the discharge gates.

The second grizzly has no mechanical elevating equipment; the trucks drive up a 2-percent earth-fill ramp, made wide to facilitate passing, to a level at which they can discharge directly on to the grizzly that separates the material into the

(Continued on page 122)



MOST OF WATERING is done by Euclid semi-trailers with 450-gal. capacity tanks and pumps designed to deliver 450 gpm. With constant speed of truck, well-regulated rate of water delivery is maintained.



SHEEPSFOOT ROLLERS make average of eight passes before desired compaction is obtained. Weight of compacted fill averaged 132.4 lb. per cu.ft. for first 100,000 cu.yd.



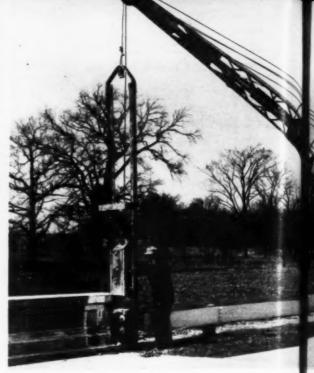
**SEVERAL SPRINKLINGS** are made during compaction to bring fines to optimum moisture content. Crew of four men in background move along fill throwing out any large cobbles that are found.



AFTER EACH SPRINKLING (below) (see sprinkler in distance) surface of impervious zone is harrowed with Kay-Brunner unit to insure intimate bond with next 6-in. layer of fill.







DRIVING OF GUARD RAIL POSTS on Indiana state highway No. 9 near Huntington is done with hammer in leads suspended from boom of

# 7 e Gia

CONSTRUCTION DETAILS

For Superintendents and Foremen TO PREPARE PIPE FOR WELDING (right), this Airco portable machine flame-cuts and bevels ends of steel, wrought iron and galvanized pipe from 4 to 30 in. in diameter in one operation. Machine weighing 50 lb. is hooked to pipe by chain with detachable slip links for different pipe diameters. Operator turns crank which rotates sprocket and chain, enabling machine to travel on pipe surface.



**TWIN MIXERS** set on deck platforms clear of car tracks permit uninterrupted street car operation during concreting by Kenny Construction Co., contractor, of Clark-Division station on State St. subway route for Chicago Department of Subways and Superhighways.

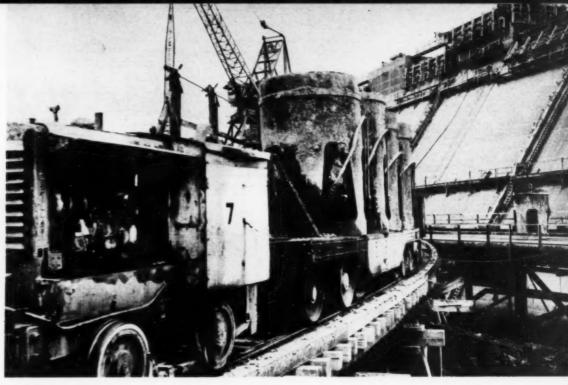




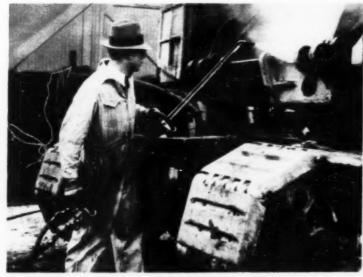
FARM TRACTORS of Ford-Ferguson type perform many utility services in moving materials and equipment for Julius Porath & Son Co., contractor, Detroit, on Ford bomber plant airport.



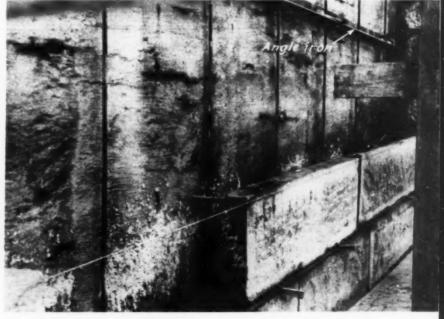
Buckeye convertible crane owned by R. H. Ellis, contractor, of Crawfordsville, Ind. Crane has metered vacuum control of all operations.



CONCRETE HAULAGE on construction trestle at Friant Dam, U. S. Bureau of Reclamation project in California, is done by 10-ton General Electric locomotives powered by Caterpillar diesel engines. From mixing plant concrete is discharged into 4-cu.yd. bottom-dump buckets on flat car. Dam being completed to height of 320 ft. by Griffith Co. and Bent Co. will contain 2,200,000-cu.yd of concrete.

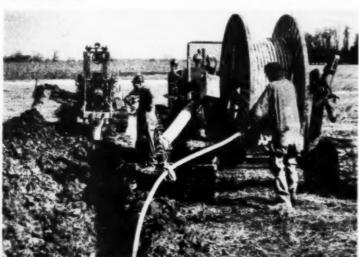


FOR CLEANING CONSTRUCTION EQUIPMENT detail of maintenance that assumes special importance in these days of priorities and shortages of all types of machines, operator at yard of Hubbard & Floyd, Inc., New York, uses Oakite steam-detergent gun, combining heat and pressure to remove grease, oil and dirt from crawler-mounted machine. Basic feature of gun is ability to spray cleansing solution under steam pressure to working heights of 12 ft. Detergent is alkaline material with emulsifying and free-rinsing properties. Heavy-duty gun is 71/2 ft. long, weighs 141/2 lb., and is equipped with rubber-covered handles. It requires minimum steam pressure of 60 lb per sq. in.



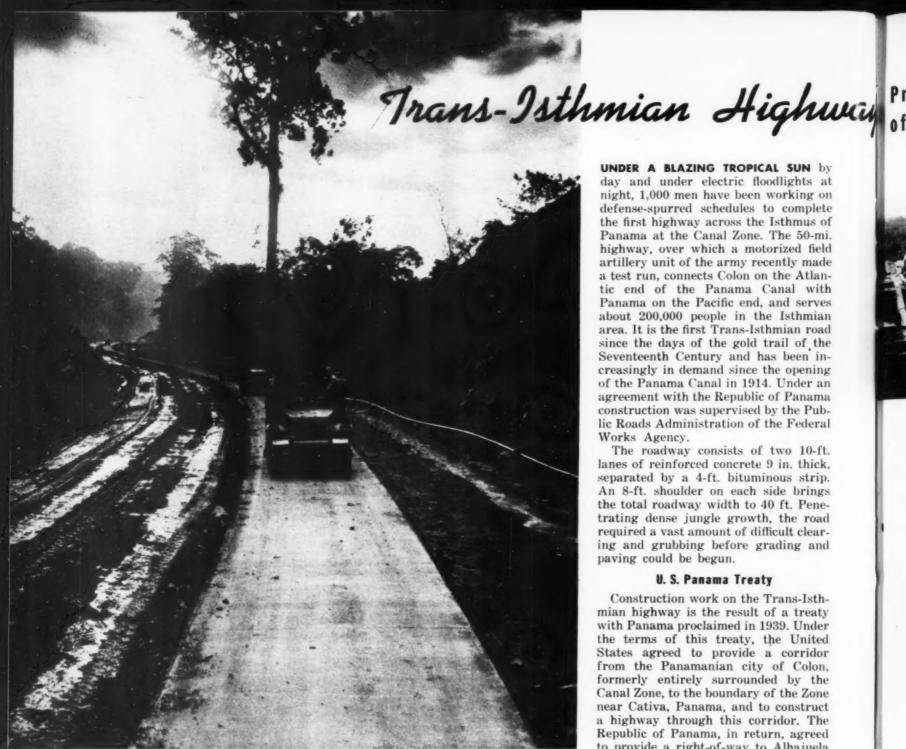
CUT STONE FACING IS ANCHORED to concrete retaining wall in Pittsburgh, Pa., with aid of framework consisting of 1/2-in, vertical steel bars passing through holes in 4-in. angle iron members secured to wall by drilling holes at 5-ft. intervals, inserting  $\frac{5}{8}$  and  $\frac{3}{4}$ -in. Rawl anchors, and calking them tightly in place.

AIRPORT HAZARD IS REMOVED (below), by eliminating overhead telephone lines in vicinity of field and placing cables underground. Trench 15 in. wide and 5 ft. 6 in. deep is dug by crawler-mounted Buckeye trenching machine of digging wheel type, operated by crew of American Telephone & Telegraph Co. Trencher is closely followed by tractor-hauled cable-laying rig.



TOUGH GROUND FOR PILEDRIVING (below), was encountered by Lake States Engineering Co., of Chicago, in building shipways at an Eastern yard where sunken ships' hulks offered obstacles to penetration of wood piles. Difficulty was overcome by equipping ends of 95-ft, piles with pointed steel shoes supplied by American Pulley Co., of Philadelphia.





TEST RUN over completed half width of Trans-Isthmian highway is made by motorized field artillery unit of Army. View shows trucks using concrete-paved 10-ft-wide lane constituting one-half of roadway width. Finished road comprises two 10-ft paved lanes separated by 4-ft-wide median strip of bituminous surfacing. Roadway is flanked by 8-ft. shoulders.

**EARTH FILL (below)** near Rio Gatun is 70 ft. high. Equipment working on it includes, from left to right, end-dump truck, bulldozer and tractor-hauled

UNDER A BLAZING TROPICAL SUN by day and under electric floodlights at night, 1,000 men have been working on defense-spurred schedules to complete the first highway across the Isthmus of Panama at the Canal Zone. The 50-mi. highway, over which a motorized field artillery unit of the army recently made a test run, connects Colon on the Atlantic end of the Panama Canal with Panama on the Pacific end, and serves about 200,000 people in the Isthmian area. It is the first Trans-Isthmian road since the days of the gold trail of the Seventeenth Century and has been increasingly in demand since the opening of the Panama Canal in 1914. Under an agreement with the Republic of Panama construction was supervised by the Public Roads Administration of the Federal Works Agency.

The roadway consists of two 10-ft. lanes of reinforced concrete 9 in. thick, separated by a 4-ft. bituminous strip. An 8-ft. shoulder on each side brings the total roadway width to 40 ft. Penetrating dense jungle growth, the road required a vast amount of difficult clearing and grubbing before grading and paving could be begun.

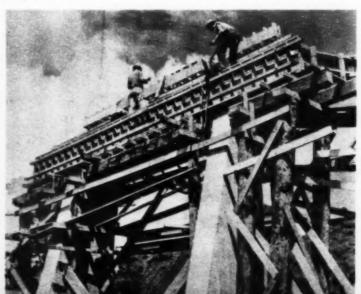
### U. S. Panama Treaty

Construction work on the Trans-Isthmian highway is the result of a treaty with Panama proclaimed in 1939. Under the terms of this treaty, the United States agreed to provide a corridor from the Panamanian city of Colon, formerly entirely surrounded by the Canal Zone, to the boundary of the Zone near Cativa, Panama, and to construct a highway through this corridor. The Republic of Panama, in return, agreed to provide a right-of-way to Alhajuela where the dam forming Madden Lake bridges the Chagres River and connects with the road from Alhajuela to Summit and the Pacific end of the Canal. The Alhajuela-Summit road was built at the time of the construction of Mad-

(Continued on page 118)



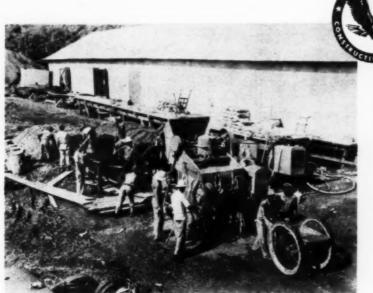




Provides Concrete-Paved Route of Strategic Importance Along Pan

**LONGITUDINAL FLOAT** finishes concrete-paved surface of Rio Hato highway in Panama.

**HEAVY GRADING** in cut near  ${
m Rio~Gatun}_t$  Panama, is done with Allis-Chalmers tractors hauling Bucyrus-Erie pneumatic-tired scrapers.

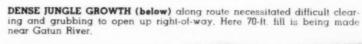


**CONCRETE FOR FOOTING** of end bent of Rio Gatun bridge is supplied by Jaeger mixer discharging into rubber-tired buggies.



IN CUT NEAR MADDEN DAM material is handled by American equipment, including power shovel, trucks and bulldozer.

**TRACTOR-SCRAPER OUTFITS** and sheepsfoot roller are busy on grading this section of Trans-Isthmian highway.







First Shipment of

Equipment Arrives

For Building

Alaska Highway



FOLLOWING AGREEMENT MARCH 18 between the governments of the United States and Canada for the construction of the Alaska Highway, urgently needed strategic route linking Fort St. John, in British Columbia, and Fairbanks, Alaska, the first trainload of construction equipment arrived recently at the railhead at Dawson Creek, B. C. From that point it was transported overland to St. John and across the frozen Peace River to start building a pioneer road that will serve as a means of opening up the northern wilderness for survey work and deliveries of men, machinery and materials for a 1,000-mi, gravelsurfaced main highway 24 ft. wide and for reconstructing about 400 mi. of existing highway. Under command of Brig. Gen. William M. Hoge, Corps of Engineers, U. S. Army, Engineer troops arrived in Northern Canada early in March and have been rushing work on the pioneer route as a preliminary to





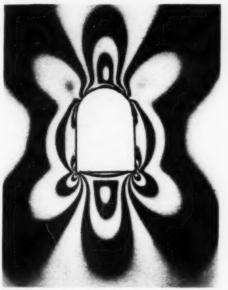
**TRAINLOAD OF TRACTORS** equipped with bulldozers, arrives at railhead in Dawson Creek, B. C and is unloaded by Army Engineers for overland trip of 60 mi. to river crossing over ice at Fort St. John



AT CROSSING of Peace River, near Fort St. John, equipment was moved over ice as light timber bridge was not strong enough to carry heavy loads.

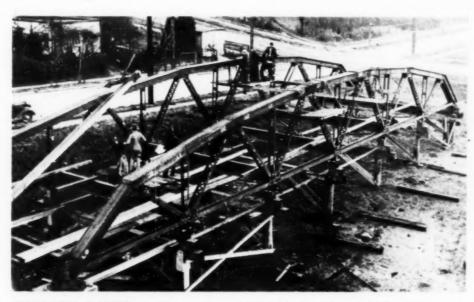


**EQUIPMENT CARAVAN**, including tractors and light power shovel, encounters tough going in proceeding overland under its own power from railhead to river crossing.





**SURREALIST ART** is suggested by these patterns of stresses revealed by photo-elastic method of stress analysis used by design offices of U. S. Bureau of Reclamation at Denver, Colo., for determining best details to use in modern irrigation structures. Pattern at left shows stresses around model of gallery in concrete gravity-type dam; at right is stress picture of rocker support for Pit River bridge superstructure. From these photographs points of weakness of actual structures can be determined in advance.

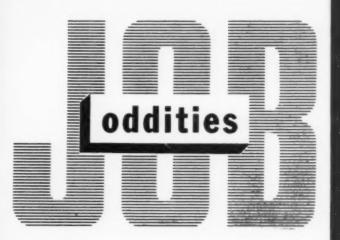


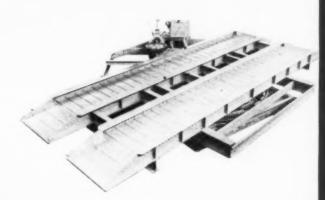
VOCATIONAL TRAINING in steel erection is afforded by this highway bridge which is repeatedly put together and taken apart by students of school operated by King County in Seattle, Wash. Old structure, originally spanning small stream, was recovered after being washed out by flood and set up in school yard for instruction of pupils in structural steel course by Principal Arthur Macfarlane, former construction foreman.

Waiton Photo



**IMPROVISED METHODS** of compacting ground surface to serve as emergency airfield somewhere in Australia are resorted to by American troops who roll weighted metal drums over runway areas to consolidate earth.





GIANT TRUCK TURNTABLE, one of largest ever built, according to its manufacturer, Blaw-Knox Co., Pittsburgh, Pa., is ready for shipment to contractors at Pacific Naval air base. Self-powered with gasoline engine for turning, turntable will handle 3-axle, 188-in. wheelbase Mack trucks weighing, with pay load, approximately 55 tons.



STEAM UP FOR WAR! Before regular heating system was installed at Westinghouse Electric's huge new Merchant Marine Works for production of turbines and gears, emergency steam heat was supplied by this retired railroad locomotive. A 60-ft stack, hooked to boiler's regular funnel, provides plenty of draft and carries smoke above building Crew of fireman and engineer keeps locomotive "running" 24 hr. a day, enabling war workers in plant to operate three shifts a day.



RAILROAD RELOCATION in reservoir area of Grand Coulee Dam, in Washington, involves use of toothed blade on tractor for clearing new right-of-way.



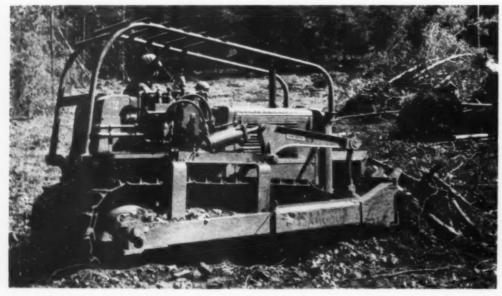
**TOOTHED BLADE** on tractor-bulldozer, is designed especially for land clearing. Teeth are of 2-in. armor plate spaced  $111_4$  in. apart.

# Toothed Bulldozer Blades

Uproot Stumps and Brush
To Speed Land Clearing

BULLDOZERS AND SPECIAL TOOTHED LAND-CLEARING BLADES mounted on crawler tractors are being used effectively in the States of Washington, Oregon, Minnesota and elsewhere for removing stumps, brush and so-called weed trees from cut-over land. In using the ordinary straight bulldozer blade for land clearing, however, it has been found that too much earth is mixed with the trash, hindering burning and requiring additional tractor power to push the combination of dirt and wood trash.

To overcome this objection bulldozer blades have been fitted with teeth that work into and under stumps and lift them with a minimum amount of earth



FINAL COMBING OPERATION collects small roots and branches, free of dirt, for burning.



**TRACTOR KNOCKS DOWN** poplar and bull pine trees up to  $1\ \mathrm{ft.}$  in diameter and moves them into windrows for burning.



clinging to the roots. With such teeth, also, operators can give the cleared land a last combing or finishing operation and, by continually working the teeth up and down, shake out the dirt and bring roots and small pieces of trash to the windrow for quick burning. Even with such teeth, however, trouble has been encountered, since they were not made big and strong enough, at first, to withstand the strain of bucking against trees, tough roots and boulders day after day.

With the object of eliminating these operating difficulties, a special land-clearing blade was developed in the Spokane branch shop of the Howard-Cooper Corp., distributors of International Harvester industrial equipment in Washington and Oregon, and used effectively, as

(Continued on page 102)



### Mobile Rig

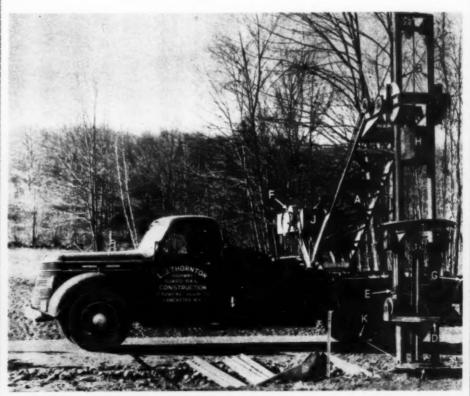
# DRIVES STEEL GUARD-RAIL POSTS AT LOW COST

IN INSTALLING POSTS for highway guard-rail in the Rondout reservoir area, New York City's Board of Water Supply saved time and cut costs by using a truck-mounted driving rig instead of setting the posts in holes excavated by hand labor. When holes were excavated and posts set by hand, one man's output for an 8-hr. day ranged from 8 to 15 posts. With the mobile driving rig, however, three men on the machine and two men setting grade lines set from 200 to 250 posts in 8 hr. The posts are 5 ft. 6-in. lengths of 80-90-lb. rail driven to a penetration of 3 ft. 3 in.

As described in a report by William T. Petherbridge, Jr., engineering inspector for the Board of Water Supply, the post-driving equipment, manufactured by the Hughes-Keenan Co., of Mansfield, Ohio, is mounted on a 3-ton International truck and is operated by the truck motor through a special auxiliary transmission and clutch. The rig, as illustrated herewith, includes a boom, A, counter-

balanced by weight J, which swings in an arc, and from which are suspended a pair of vertical guides, B, terminating in a flat plate, C, perforated to the cross-sectional outline of the standard 80-90-lb, rails which form the guard-rail posts. Running inside the guides is a second plate, D, similarly perforated to hold the post plumb during driving.

After the post is inserted in the rig, plate D is raised about 2 ft. where it is stopped by dogs, E. thus holding the post plumb for driving. The post is accurately plumbed and spotted in line by moving the boom and operating line from ratchet, F, and cable line, K, running from winch, G, to bottom plate of guides. The driving hammer, H, weighs 1,100 lb., has a maximum drop of 10 ft. and is operated by a slip clutch from the truck motor. Posts were driven at spacings of 10 ft. along the highway and were strung with four strands of cable held in place by slotted springs attached to the posts.



TRUCK-MOUNTED BOOM supports vertical guides and 1,100-lb, hammer for driving into ground steel rail sections forming guard-rail posts.



PROTECTIVE ASPHALT COATING is applied to pipe by special traveling machine and covered by asphalt-impregnated felt wrapping.

# Long Pipe Line Crosses Seven States To Deliver Oil From Louisiana to North Carolina

LONGEST PETROLEUM PRODUCTS PIPE LINE ever constructed is the 1,261-mi. artery across seven states, from Baton Rouge, La., to Greensboro, N.C., which the Plantation Pipe Line Co. completed in only 7 months at a cost of \$20,000,000 to insure overland deliveries of oil and avoid possible sinkings of tankers along coastal water routes by enemy submarines. The new pipe comprises 788 mi.



LAYING OF PIPE in long sections with welded joints is done by tractors equipped with side booms.

IN VAN OF CONSTRUCTION EQUIPMENT is crawler-mounted trenching machine that digs to minimum depth of 3  $\,$  It. It is closely followed by welding and pipe-laying crews.

FINAL OPERATION (below), of pipe line crew consists of backfilling trench with tractor-operated scraper.



of main line 12 and 10 in. in diameter, and 473 mi. of branch line 8 and 4 in. in diameter. It is owned jointly by the Shell Union Oil Corp., Standard Oil Co. of New Jersey and Standard Oil Co. (Kentucky). From an elevation above sea level of 46 ft. at refineries in Baton Rouge, the line reaches a level of 920 ft. at its North Carolina terminus.

Location of the route was aided by mosaics of aerial photographs taken preliminary to actual land surveying operations. The right-of-way crosses 14

(Continued on page 102)

### TO ARCHITECTS AND ENGINEERS ABIGH

HIS FREE REFERENCE BOOK shows in detail how designers are taking full advantage of the TECO System of Construction by using timber as a modern engineering material. Available to any architect or engineer who has not already received a copy. Please write on your firm letterhead.

WASHINGTON, D. C.

PORTLAND, OREGON

### Present and Accounted For ... A PAGE OF PERSONALITIES



CHIEF ENGINEER in charge of planning and construction of war projects and other public works of Federal Works Agency is COL. WILLIAM N. CAREY, who until his appointment directed design and building of Air Corps facilities in Jacksonville, Fla., area.



AS NEW PRESIDENT of Constructors Association of Western Pennsylvania, WILLIAM F. McCRADY, of McCrady Construction Co., Pittsburgh, heads one of most active and successful chapters of Associated General Contractors.



NEW CONSTRUCTION BUREAU to consolidate construction functions of War Production Board has as its chief WILLIAM V. KAHLER, on leave as chief engineer of Chicago area, Illinois Bell Telephone Co. Among its duties, construction bureau recommends project priority ratings and administers conservation order L-41.



DISTINGUISHED ENGINEER. President MANUEL PRADO of Peru shakes hands with FREDERICK MARDUS (right), consulting engineer, New York City, chairman of symposium on Latin-American engineering-economic development at annual convention of New York State Society of Professional Engineers. Looking on, from left to right, are: ARTHUR V. SHERIDAN, Bronx Commissioner of Borough Works; EDWARD LARSON, executive secretary, National Society of Professional Engineers, Washington, D. C.; DR. D. B. STEINMAN, Robinson & Steinman, consulting engineers, New York City; JOHN C. RIEDEL, chief engineer, Board of Estimate, City of New York; and F. H. ZURMUHLEN, chief engineer, Walsh-Driscoll Construction Co., New York City.



**KESWICK DAM** in California is being built under supervision of E. M. JENNETT (left), resident manager for Atkinson-Kier Co., contractor, who here shakes hands with C. M. JACKSON, inspector for U. S. Bureau of Reclamation, in front of first 6-yd. bucket of concrete placed last fall.



WINNERS OF ACCIDENT PREVENTION CONTESTS of Associated General Contractors receive safety trophies at annual convention. Left to right: THOMAS B. CARMICHAEL with Zachry trophy which he received for Thorpe Construction Co., Akron, Ohio, winner of Highway Division contest; L. J. MONTGOMERY, of J. A. Terteling & Sons, Boise, Idaho, winner of Heavy Construction and Railroad Contractors' Division contest, awarded Swenson trophy; L. P. RICHARDSON, vice-chairman of accident prevention committee, who awarded trophies in absence of Chairman E. J. Harrison; H. A. DAVIS with Shackelford trophy, won by his firm, Cleveland Construction Co., in Building Division.



ON "WEST CENTRAL" HEATING PLANT in Washington, D. C., under construction for Public Buildings Administration, FRANK TRANSOU (left) is foundation superintendent and FRANCIS M. TOMPKINS is project manager for Chas. H. Tompkins Co., contractor. Plant is being rushed to provide heat this fall for many temporary office buildings being built in Capitol City.

## CONSTRUCTION TOPICS OF

# LAB MORTAR MEASURES EXPLOSIVES' STRENGTH



If you're a blasting expert you know how strong an explosive should be to do a particular job. But did you ever question how a manufacturer can be sure that the dynamite he sells you is equal to the percentage strength marked on the case?

The accepted test today for explosives' strength is made with the Du Pont Ballistic Mortar shown in the picture on the left. It's a big pendulum with a steel explosion chamber at the free end. A small weighed charge of the explosive under test is placed in this chamber and confined by a heavy steel shot. It's fired—the shot is ejected—and the pendulum recoils, swinging back along a graduated scale. Comparison of the swing with that for a known standard gives the basis for a quick and accurate determina-

tion of the strength of the sample—whether it's a powder made to a new formula or an explosive already in production.

The Ballistic Mortar is a remarkably accurate means of measuring the tremendous force of an explosive. Yet it is but one of the many pieces of special equipment developed at the Du Pont Explosives Research Laboratory to further the development of blasting agents and accessories.

Today this research plant and all of the resources of the Explosives Department of du Pont are concentrated on one objective—to speed war production by helping industry get better results from blasting. If you have a problem in blasting, these facilities are available to you through the nearest du Pont representative.

### "CZC" Wins New Place For Wood

One of the lessons coming out of the war construction program is the fact that lumber treated with Du Pont "CZC" (Chromated Zinc Chloride) is not merely a substitute for steel, but actually a distinctive structural material in its own right.

"CZC"-treated lumber has all the excellent properties of untreated lumber plus outstanding qualities of its own. As a result, it is winning a place in essential structural work which it will undoubtedly retain even after the war is won.

"CZC"-treated lumber outlasts untreated wood many times, due to the protection given against decay and termites. In addition "CZC" is a "clean" treatment that leaves wood odorless, paintable, safe to handle and with a definite, measurable fire resistance.

Compared with other building materials, wood treated with "CZC" has the advantage of easy, rapid fabrication in the hands of more readily available skilled men. It is currently available for permissible uses. Write for complete information.

# Safety in tunneling aided by Du Pont "Ventube"\*

Tunnel contractors use "Ventube" primarily as an efficient means of maintaining good air conditions at their headings. The improved air conditions are naturally reflected in increased speed of driving and in lower costs.

But there is another important reason for using the "Ventube" system of auxiliary ventilation in tunnel construction. That reason is safety. In many tunneling projects today, the use of trucks and gas locomotives has created a new ventilation problem. The ventilation must be sufficient to carry off all carbon monoxide gas which these trucks or locomotives are continually exhausting into the air.

"Ventube" has successfully met these requirements. It can provide good air conditions in spite of the additional problem of carrying off exhaust fumes. Further, "Ventube" is an effective tool in combating silicosis. For best results, two lines of "Ventube" are used, one for bringing fresh air to the working face, the other for blowing out vitiated air.

"Ventube" for tunnel construction is at present available only for use on war orders. For further information on "Ventube", send for your copy of the new "Ventube", handbook. E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Empire State Building, New York City.

"Ventube" is Du Pont's registered trade mark for its rubber impregnated flexible ventilating duct.

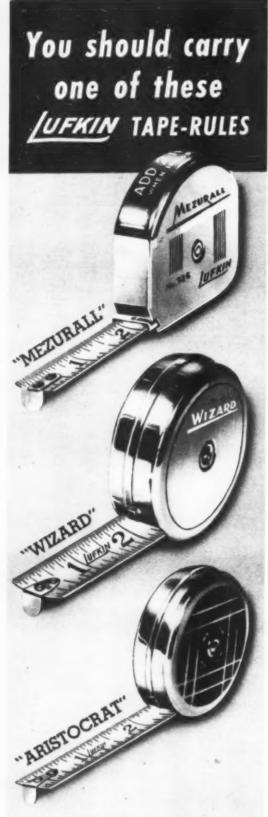


### DID YOU KNOW?

"VENTUBE" ventilating duct is provided with detachable couplings and Y, L, T and reducer fittings.

are used in rivets to speed airplane construction. That much of the development work on these "explosive rivets" was done at the DuPont Explosives Research Laboratory.

LUMBER is a recognized Government standard covered by Master Federal Specification No. TT-W-571B.



If you ever acquire the habit of carrying a taperule, you'll wonder why you waited so long to get it. They're as handy as a watch to carry—and as useful, too. Your dealer will help you select the one best suited to your needs. May we send you a free copy of our new Catalog?



# CONSTRUCTION EQUIPMENT NEWS

FIBER TUBES for concrete pier and column forms are furnished either pre-cut to length or in longer pieces of any desired length up to 40 ft, for cutting by hand to fit pier heights on job. Tubes are built up of spiral-wound plies of paper with a bonding agent. Strong enough to resist handling and concrete placing to





any depth, tubes are easily installed with carpenter's tools. They may be left in place or stripped by wetting and removing paper to expose pier concrete. Tubes are available in following inside diameters to replace square piers of sizes noted: 9-in, diam. (for 8x8-in, piers); 11½-in, diam. (for 10x10-in, piers); 13½-in, diam. (for 12x12-in, piers); and 16-in, diam. (for 14x14-in, piers). Larger diameter forms also are available for pier footings and pedestals.—Beacon Steel Products Co., 12 East 41st St., New York, N. Y.

### CORRECTION

AN ARTÍCLE ON FLIGHT STRIPS by Lieut. Col. Stedman Shumway Hanks in Construction Methods, May 1942, p. 53, contained an error with reference to the design stress requirement for runways. The figure has been corrected by Colonel Hanks to its true value of 97.5 lb. per sq. in., which should be substituted for the mistaken figure of 583 lb. per sq. in. quoted on p. 118 of the May number.

# Get help in passing license exams from this practical book

Here is a compact, handy manual by two well-known engineering writers, that meets all needs for quick review of, or reference to the most important elements of designing simple structures—of special value to those preparing for license or registration exams.

### Elementary Structural Engineering

By LEONARD C. URQUHART and CHARLES E. O'ROURKE

Professors of Structural Engineering Cornell University

348 pages, 6x9, 204 illustrations. \$3.00

THIS book covers the fundamental principles of structural theory and design in steel, timber, and concrete, together with a discussion of the essential fundamental principles of mechanics and properties of structural materials.

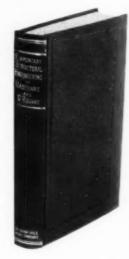
A concise explanation of the basic principles of structural mechanics has been included, to lead toward a deeper understanding of the subsequent design theories and methods.

Various methods of computing deflections of beams and trusses are outlined in another chapter, together with applications of these methods to typical practical problems.

The remaining chapters explain and apply the theories involved in the design of the various structural elements, such as homogeneous beams of timber and steel, plate girders, reinforced concrete beams, tension and compression members in steel and timber trusses, columns of timber, steel, and reinforced concrete, members subjected to bending and axial stresses, and footings.

### See what the book gives you:

- helpful groundwork in the principles of structural mechanics
- useful thumb-nail review of materials; characteristics, properties, fabrication, working stresses, etc.
- chapter of classification and requirements of loads for various types of structures
- methods of computing deflections of beams and trusses
- elements applying to the design of connections and splices.



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Models for light, medium and heavy duty service are in the complete Thor line of Paving Breakers . . . all built to turn out fast work at low cost. For full information and specifications write for Thor Catalog No. 42.

> The complete Thor line of Contractors' Tools includes Rock Drills, Paving Breakers, Clay and Trench Diggers, Sump Pumps, Backfill Tampers, Grinders, Saws and Hammers.



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13½ Inside Diam.

144 Square Inches

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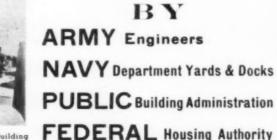
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Figure Lengths for Entire Building



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ing a clean, smooth, job.



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widely used in approved

government construction.

Cut to Lengths on Job



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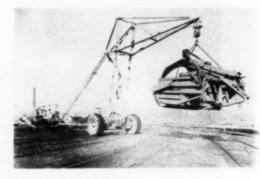
ROCKINGHAM, N. C

GARWOOD, N. J.

LOWELL, MASS.

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CRANE FOR ARMY USE said to offer large crane lifting power with tractor mobility. Has 20,000 lb lifting capacity horizontal distance of 20 ft. 6 in out from axle center in upright position, making possible quick and easy handling of bulky, heavy



loads. Available in 20- and 40-ft. boom lengths. Operated from any size tractor or Tournapull with Le Tourneau double-drum power control unit. All welded box-type construction of special steels Rubber tires permit travel over concrete surfaces and give ample flotation for working in soft mucky conditions. Connected or disconnected in few minutes, freeing tractor for other use when lifting jobs are finished. May be towed from job to job behind trucks.—R. G. LeTourneau Inc., Peoria, Ill.

QUICK-HARDENING IRON CEMENT has been developed for patching of cracks, ruts and shallow holes in concrete floors. Said to harden quickly and to adhere firmly to surface. New cement has iron base, making it wear resistant, dustproof, oilproof and waterproof.—Smooth-On Mig. Co., 570 Communipaw Ave., Jersey City, N. J.

LIGHTWEIGHT CENTRIFUGAL 1½-IN. PUMPS, 3,000 gph. capacity, known as "Rex, Jr." is said to have all engineering leatures of this standard line, including "peeler"; device claimed actually to peel air from whirling impeller, thus speeding up prime. Large semi-steel recirculating water chamber. Pow-



ered by single cylinder, 1-hp. air-cooled engine, equipped with automatic governor that speeds up motor when pump catches its prime and starts to lift water, thereby eliminating undue strain on power unit at low speeds and assuring economical performance. Especially useful in pumping water from excavations and keeping seepage levels low on bridge and other construction jobs, but also valuable in operations of utility companies industrial plants, municipal and county sewage commissions, and other organizations that have water-moving problems to contend with. Overall dimensions length, 15½ in; width, 11¾ in; height, 15¾ in. weight, 57 lb—Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis,

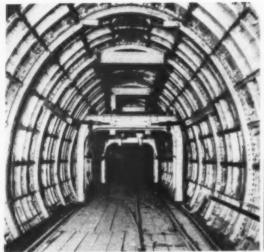
# CORRECT TIMING FOR SLAB FINISHING

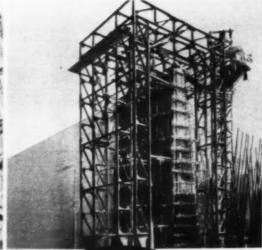
Concrete airport runways and aprons, require accurate surface finish for smooth take-off and landing. The Koehring Longitudinal Finisher finishes slab surface accurately by the mechanical method. The right time to finish the concrete slab surface is after the initial set has occured. Manual finishing is not always correctly timed because of the physical limitations of the manual method. Koehring Finisher operates efficiently at any distance behind the paver, as determined by the initial set. Be sure, have accuracy, with the Koehring Longitudinal Finisher.

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cast en-block - a compact arrangement that makes for streamlining and releases critical materials which are so badly needed in our present crisis. So, for any job that requires compressed air-Drilling, Concrete Breaking, Tamping, Demolition, Trench Digging, Pile Driving, Riveting, etc., specify Schramm—the Lightweight Champion that can step out of its class and take on the toughest of them.

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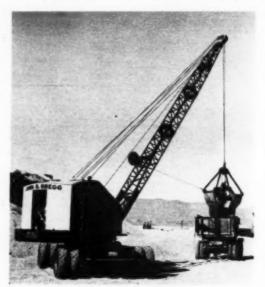
1½-YD. TRENCH HOE, said to provide improved trench hoe performance in its range, accomplishes faster digging by new gear-driven booster device with positive primary chain drive. This auxiliary



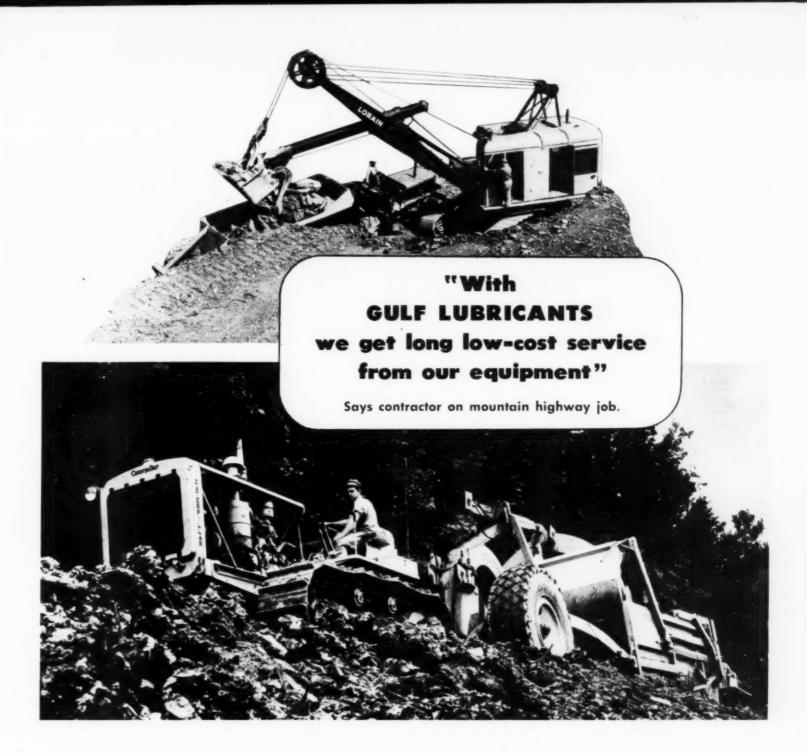
drum unit is claimed also to speed dipper reversing action and to assure greater smoothness and accuracy in controlling dipper. Digging depth, 22 ft., reach, 37 ft.; dumping height, 16 ft. All-welded alloy steel construction throughout.—Harnischfeger Corp.

FOR LUBRICATING HEAVY-DUTY gasoline and high-speed diesel engines, a new Texaco product, Ursa Oil, is fortified by a detergent that provides a Ursa Oil, is fortified by a detergent that provides a washing or cleansing action, keeps deposits from forming on engine parts and holds deposit-forming material suspended in the oil. Carbon, sludge and other particles are removed during regular drain periods, so that ports, pistons ring grooves, oil lines, screens and filters stay clean, and fuel economy is improved. The lubricant is designed to provide maximum protection for modern bearings in the heaviest service.—The Texas Co., 135 East 42nd Street, New York, N. Y.

ONE-MAN CRANE CARRIAGE available for all makes and sizes of cranes from 5 to 40 tons is equipped with special center-pin and drive mechanisms which permit all operations of both crane and carriage to be controlled from operator's cab. Inclosed final drive of pneumatic-tired under-carriage, powered from crane engine, moves complete



assembly at speeds of 2½ to 17½ mph.; unit travels with cab in any position. Operator has complete control of travel, including steering and braking. Front wheels mounted on separate spindle shafts give short turning radius and maneuverability said to equal that of small truck. Other features claimed for Maxi crane carriage; air brakes with extra large brake shoes and drums; hydraulic steering, stability obtained by centering crane on carriage, which is longer and wider than conventional crawler-type units; dual 14.00x20-in, tires on all wheels.—Six Wheels, Inc. 1572-84 East 20th St., Los Angeles, Calif.



#### "Proper lubrication helps us avoid excessive wear and serious mechanical troubles"

ITH new equipment and repair parts hard to get, more than ever we rely on proper lubrication with Gulf oils and greases," says highway contractor. "Gulf lubricants provide the kind of protection that enables us to secure long, low-cost service from every unit."

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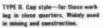
M. S. A. Skullgards have served the American worker with head safety and comfort for years—under all conditions of use, in every industry where head hazards exist. Hard knocks and severe exposure in all jobs and climate have clinched Skullgard's leadership as the Work Hat of Today—the only protective

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not only in cost of removal, but also in cost of maintenance, since wire removed is ready, either for immediate re-use or to be sold to smaller companies for their requirements. Claimed to reclaim all sizes of copper and iron telephone wire from poles, to coil 10 mi. of wire suitable for immediate use in one hour Requires one operator and helper who assists in stripping reels. Manufacturer claims that this winch, 10 wires (each 1 mi. long) can be coiled at same time at speed of 150 ft. per min., and that reclaimed coils are nearly as perfect as original factory coils. Five-wire detachable reclaiming reel unit which can be slipped on extended shaft of standard winch usually on utility truck is recommended for use when small quantities of wire are to be reclaimed—Gar Wood Industries, Inc., Detroit.

PENCIL TRACING CLOTH, known as Penciltex, is said to have processed, velvety surface which permits dense and sharp pencil lines; to be tough durable and not to discolor with age; to have glossy, stay-clean back and extra transparency which adds speed to print production. Its antismudge feature is said to permit use of 5H or harder pencil and to produce same dark, dense line as 2H or 3H on ordinary tracing cloth. Detail made with hard pencil said not to smudge or rub off. Penciltex claimed to erase quickly and cleanly with art gum or soft eraser, and erasures will not show on blue print. Available in 20-yd. rolls in widths of 30, 36 or 42 in. or in sheet sizes to fit normal needs.—The Frederick Post Co., Hamlin & Avondale Aves., Chicago. III.

\* . \*

GLAZING COMPOUND called Super-Speed Perma-Glaze is said to speed up glazing operation on prefabricated sash and doors and on wood and steel sash both industrial and residential, by virtue of



its easy-working, fast-setting, non-cracking qualities. Product is primeless; requires no mixing. Tests of compound are said to have demonstrated that it provides strong adhesion, fast setting, minimum shrinkage, permanent alignment, uniform quality and consistency, and quick, easy application—The Biddle Co., St. Louis. Mo.



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(Asphaltic)

SEWER JOINT

COMPOUND

(Used Cold)

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### For Immediate Shipment!

If you are faced with a shortage of Sewer Joint Compound such as exists in certain sections of the country due to War conditions, you can proceed with your work without loss of time by using KALKTITE.

Large quantities of KALKTITE have been, and are now being used on Government sewer projects in all parts of the country. Some of these projects include:

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Also SULPHO-SEAL

Sulphur silicate compound
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JOINTS IN VITRIFIED
JOINTS IN CHEMICAL
PLANTS AND CEMENTING FLOOR TILE (priority required).

KALKTITE can be used in wet trenches—no delay because it sets up internally—even under water. KALKTITE is acid and root resisting and is easy to use by inexperienced labor. It has thoroughly proven its superior qualities during the 13 years it has been on the market. Get the facts *now* about KALKTITE, and its many advantages over other types of sewer joints.

PROMPT SHIPMENTS can be made today—write, wire, or telephone for quotation and complete information.

#### PRESSTITE ENGINEERING COMPANY

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### **TWISTYES**

A combination Tie and Spreader used on National Defense **Projects from Coast** to Coast.



#### **FEATURES:**

#### THE TIE

PROVIDES A 3000 Ib. WORKING LOAD ASSURES ACCURATE WALL WIDTHS BROKEN-OFF BACK OF THE WALL FACE REMOVED WITHOUT STRIPPING FORMS

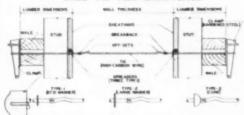
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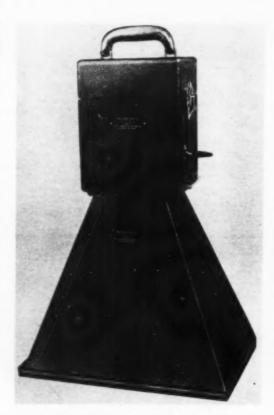


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10-AND 20-TON TRANSIT CRANES are not only fully convertible from crane to clamshell, dragline shovel and dragshovel service, but also from wheel mounting to standard crawler mounting for occamounting to standard crawler mounting for occasional jobs inaccessible to wheel-mounted units. Wheel mounting provides all-welded base giving maximum strength per pound of weight. Tandem rear axles mounted on equalizer beam assure full traction over rough ground. Dual worm drive said to apply power smoothly. Rugged transmission



provides 10 forward and 2 reverse speeds. provides 10 forward and 2 reverse speeds. Use of two identical engines, one for propelling, other for handling hoist, swing, etc., simplifies maintenance and repair. Maximum speed on level ground; smaller crane, 27.5 mph.; larger, 31 mph. Other features: full power-controlled boom operation, through boom hoist which is completely independ-ent of all other functions, accounts control of wing ent of all other functions; accurate control of swing and hoist through direct-action clutches which give operator "feel" of load; full utilization of anti-friction bearings to gain maximum efficiency and minimize wear, oil-inclosed gearing—Bucyrus-Erie Co., South Milwaukee, Wis.



Many every-day jobs that eat up profits when done by hand methods can be handled faster, better and cheaper with YOUR MALL Vibrator. Pumpjng, Form Sanding, Wet Wall Rubbing, Grinding, Drilling, Sawing, Wire Brushing, Sharpening Tools and Bits and other tasks are a set-up for this multiple duty unit. Each of the light-weight, swivel-fitted tools for these applications can be changed in a jiffy to save time between jobs and all operated efficiently by any MALL Gasoline, Pneumatic or Electrically powered Vibrator.

Pneumatic or Electrically personal ways and sale attachments? We'll gladly show you how. Write TODAY for our latest catalog and ask for a FREE

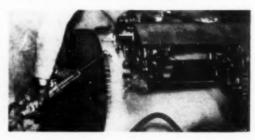
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### FASTER, EASIER way to maintain concrete mixers, trucks!



Oakite Compound No. 32 removes hardened concrete deposits from mixers and trucks QUICKLY...THOROUGHLY...ECONOMICALLY! First, get rid of loose dirt, grease, oil, etc. with Oakite

steam detergent cleaning. Then apply recommended solution. Let soak . . . rinse . . . neutralize. Sound metal not affected. Eliminates wire brushing, scraping, etc. Saves time . . . saves

#### MORE HELPFUL IDEAS ... FREE!

Illustrated, 24-page manual tells how to speed maintenance of gasoline, gas and Diesel engines, water-cooled com-pressors, roadbuilding equipment, etc. Your copy is FREE . . . write today!



OAKITE PRODUCTS, INC. 24G Thames Street, NEW YORK, N. Y. We're Right With Uncle Sam



Balanced!

Weight is distributed over all the track rollers—no overhang—no "toeing out" of tracks.

Tractors require less maintenance too, when equipped with Bakers!

Long before it was important to conserve materials and manpower thrifty Baker Hydraulic Bulldozer owners found out how simple they were to maintain—no sheaves, cables or brake bands to replace—they've been conserving vital materials and manpower for years! They have a lot less parts than any other tractor front-end earth moving equipment and fewer parts, of course, implies less maintenance and less lost time.

Baker Hydraulics are simple—nothing complicated about them—they're direct—that's the secret of their faster, easier handling. Direct lift and down pressure on the blade. Pick up a weight placed next to you—then try picking up the same weight at arm's length. Get the idea? This is an old sweet tune to many contractors—that's why you see so many Bakers on war projects.

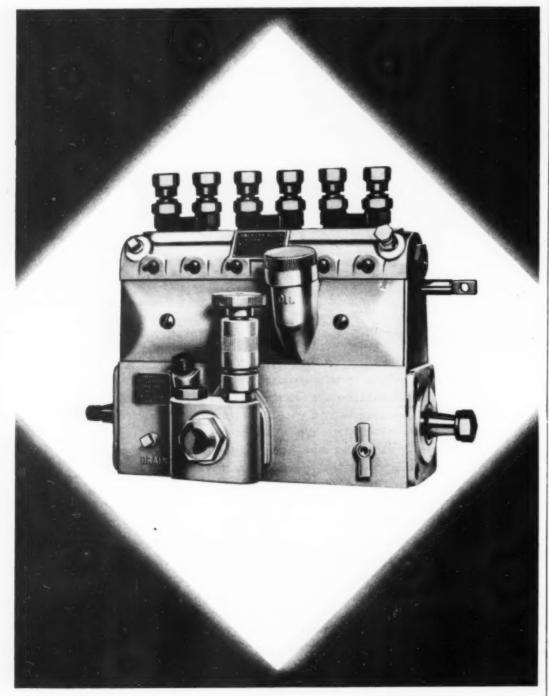
The unit with a load and a half shown above is one of 21 Baker Hydraulics on an Army Ordnance Project. Bulletin 834 tells the other savings and advantages exclusive to these "landscape-changers".

THE BAKER MFG. CO.
568 Stanford Ave., Springfield, Ill.



The Modern Tractor Equipment Line for EARTH MOVING SNOW REMOVAL ROAD MAINTENANCE

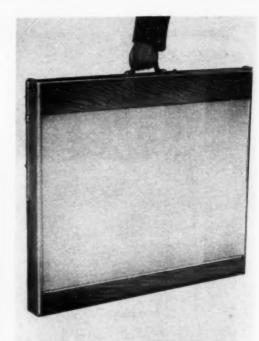




# AMERICAN BOSCH DIESEL INJECTION EQUIPMENT

AMERICAN BOSCH CORPORATION SPRINGFIELD, MASS.
BRANCHES, NEW YORK, CLEVELAND. DETROIT, CHICAGO, SAN FRANCISCO

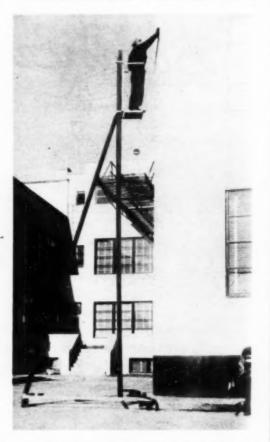




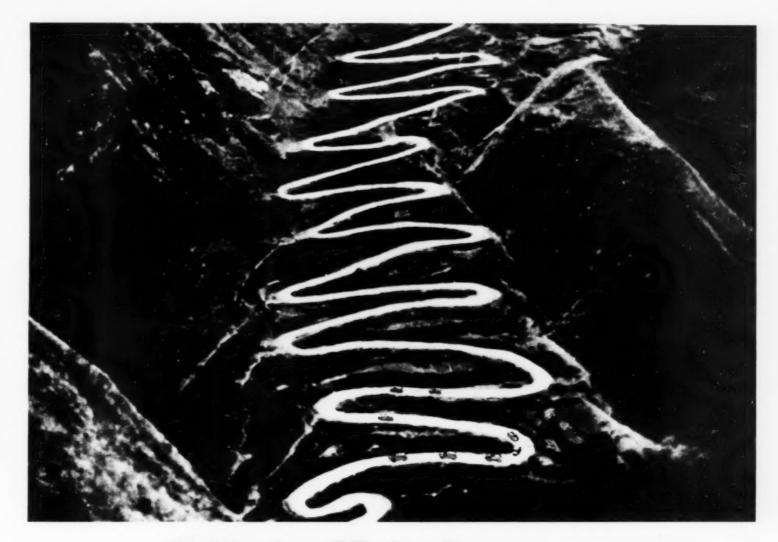
PORTABLE TRACING BOARD 36x31 in.x3%-in. deep of white pine, manolac finish, is compact space-saving unit said to be easy to use. Even, glareless light furnished by fluorescent lamps. Plate glass tracing surface 24x36 in. Adjustable stop rods hold board in place when used on inclined surface. Black split leather handle bolted to top edge. For 110-v. current only.—Hamilton Manufacturing Co., Two Rivers. Wis.



SAFETY ELEVATOR SCAFFOLD may be erected in 2 min; according to its makers, and workman can work from it, using both hands, at any height to 17 ft. Designed for 200-lb. working load, scaffold



is mounted on four rubber-tired casters on widestable base. May be made stationary or moved by man using it. User stands close to his work and is relieved of strain, fatigue and danger, increasing efficiency and production.—R. W. Fieroh Co., Inc., S. Hoyne Ave., Chicago, Ill.



# Built for Main Street . . . but they made good on the Burma Road

THE Burma Road is an incredible highway. It's a 700-mile narrow, unpaved corkscrew twisting perilously through jagged mountain ranges. Yet this road with its treacherous curves and steep grades, often blocked by landslides and pockmarked by bombs, long served as the vital route for China's war supplies.

Here a fleet of American-built trucks, many equipped with B. F. Goodrich Silvertown Tires, several years ago began to deliver the goods over a road called impassable.

These tires are the same "First in Value" tires that are the choice of truck owners on Main Street, U. S. A. And the choice of

contractors and engineers for use on all types of construction projects! Construction men know from experi-

Construction men know from experience that they can always depend on a tire that carries the B. F. Goodrich name—whether it be for truck, scraper, grader, or any other type of modern earth-moving equipment.

Today, from the vast line of Silvertowns for the construction field, your B. F. Goodrich dealer can help you choose one tire especially designed — not only to fit your equipment, but to meet the operating conditions on your particular job — whatever its nature. Buy your next tires this way and be assured of longer wear. You will

save money in the long run — and help conserve rubber for America's vital war

Make B. F. Goodrich the one dependable source of supply for all your rubber products requirements — hose, belting, accessories, and rubber footwear, as well as tires. Remember, in war as in peace, it's B. F. Goodrich — First in Rubber.

#### Gree TIRE GUIDE!

Describes each off-thehighway tire in detail, tells the type of service it's designed for, and the type of equipment it's to be used on. Gives tips on tire care and tire maintenance that will help you conserve rubber and save money. For your free copy write The B. F. Goodrich Company, Dept. T-83, Akron, Ohio, today.







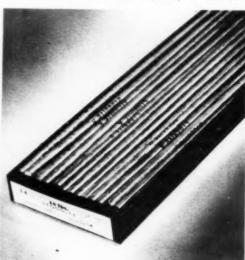
WOOD FOUR DRAWER FILING CABINET, manufactured by The Wabash Cabinet Co., Wabash, Ind., is designed for purpose of conserving vital war materials, has total metal content of 37 oz. and is said to save more than 135 lb. of steel for other



uses. Side and back panels and drawer bottoms are made of Masonite "tempered Presdwood." Selected seasoned woods are used in frames and drawers which are glued, screwed and braced with inset joints. Ten fiber rollers support drawers, mounted on full wood suspension. Exposed hardware is metal with baked bronze enamel finish. Cabinets are finished in olive green. Weight, 86 lb. as against 140 lb., for steel file—Distributor, Horder's Incorporated, Jefferson & Quincy Sts., Chicago, Ill.

\* \* \*

HARD-FACING RODS marketed under names of Stoodite K and Stoody Self-Hardening K have been developed to serve companies unable to furnish high priority ratings. Former is cast hard-facing rod consisting principally of molybdenum, tungsten, manganese, silicon, carbon and iron and may be had in bare and coated forms for oxyacetylene and elec-



tric applications. Available in five rod sizes:  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$ ,  $\frac{1}{6}$  and  $\frac{3}{8}$  in., and in rod lengths of 14 in. Stoody self-hardening K is composed of molybdenum, manganese, silicon, carbon, vanadium and iron and is made in form of tubes with mixed alloys on inside. Also supplied bare or coated in three rod sizes  $\frac{1}{16}$ ,  $\frac{3}{16}$  and  $\frac{1}{4}$  in. and 14 in. in length for electric rods and 28 in. for acetylene rods.—Air Reduction Sales Co., 60 E, 42nd St., New York City.

# To Conserve Vital Man-Hours and Lay Concrete Faster use the Whiteman "3-Step" Precision Method



You can increase the labor capacity of your present crews 40% by equipping them with WHITEMAN machines for laying concrete slabs, indoors or out. You will produce better concrete even under adverse weather conditions. You will conserve manhours and the slab won't "get away" from you.

On large or small areas, WHITEMAN Machines permit you to use a drier mix, lay it in less time with fewer men, and still deliver denser, stronger, level concrete, at lower cost.

Here's the WHITEMAN 3-Step method of placing better concrete slab faster.

SCREEDING—The power operated screeds on the WHITEMAN Rodding Machine make 5-in. transverse strokes on the header boards, levelling and compacting the mix. A steady pull forward by the operator advances the machine. Low slump mix is no problem — 4 yd. of 1-in. slump can be placed in 5 minutes.

FLOATING—Put the "Heavi-Duti" 12 gage steel trowels on the WHITEMAN Finishing Machine when ready to float the slab. One man can cover 1,000 sq. ft. in 15 minutes. The concrete is again levelled and compacted with moisture brought to the surface.

FINISHING — Attach the 17 gage steel "Finish" trowels to the same dual purpose WHITEMAN Finishing Machine, then the operator guides the rotating, adjustable-pitch trowels over the slab. Without handwork, a smooth, level surface is finished in half the usual time. Again, one man covers 1,000 sq. ft. in 15 minutes.

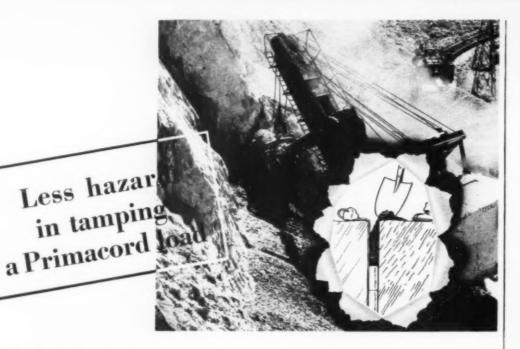
Just two reasonable priced machines multiply the production capacity of your crews, permit you to complete your job ahead of schedule.

Manpower is too scarce to waste now when "Time is short!" If you haven't seen WHITEMAN machines saving time on Screeding, Floating and Finishing work — wire today for the nearest distributor's name. He will show you how to conserve man-hours and place better concrete.

OWhiteman MANUFACTURING CO.

3249 Casitas Ave.

Los Angeles, California



When Primacord is the detonating agent, it eliminates any need for a blasting cap in the bore hole. Tamping is safer!

Primacord is insensitive to fire, friction and ordinary shock. Its explosive force must be *deliberately* released by activating a blasting cap. This cap usually located some distance from the hole—is not attached until connections are checked, equipment moved, and men in a safe place.

Primacord offers many advantages in safety and savings. Try it for your work.

THE ENSIGN-BICKFORD COMPANY SIMSBURY, CONNECTICUT

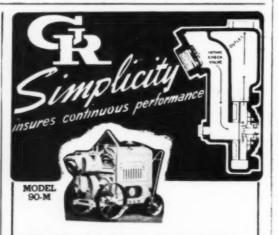
Manufacturers of Safety Fuse since 1836

PRIMACORD-BICKFORD DETONATING FUSE

A BIG MOUTHFUL WITH EVERY BITE!

You can depend upon the greedy jaws of Industrial Brownhoist clamshell buckets to speed up your material handling. Their deep clean bites practically eliminate hand shoveling. Fast opening and closing action. Extra sturdy. Minimum rope wear and maintenance. Standard types (rope-reeve, power-wheel and link-type) in stock for immediate delivery. Write for further information.

## INDUSTRIAL BROWN HOIST



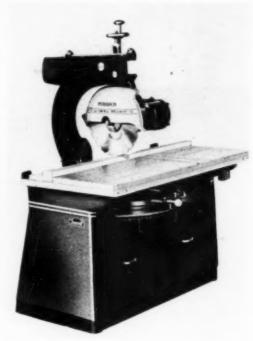
G&R Pumps differ from other self-priming centrifugals because they have no re-circulation orifice to clog, nor a shut-off valve to jam. The water passage has the same area as the suction hose and nowhere is the water velocity checked, thus allowing no solids to accumulate and clog the pump. (Note water passage in sectional drawing.) With G&R Pumps there are no shut downs for cleaning out. . . . Insist on the Gorman-Rupp — the only truly non-clogging contractor's pump.

Stocked for immediate shipment in 100 principal cities.



THE GORMAN-RUPP CO., MANSFIELD, OHIO

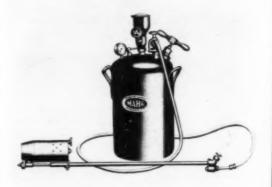
STREAMLINED RADIAL SAW called "The Streamliner" incorporates uni-point principle which permits operator to make instant setting for any crosscut angle with saw blade cutting into work at same point on table, claimed to enable operator, with snap-speed accuracy to set machine for any cut



without raising or lowering saw or making any other complicated adjustments. Other features: (1) Telescoping ram; no projecting parts to strike operator's head or shoulder. Entire work table free and clear of all obstructions when saw is pushed back. (2) All adjustments made from front of machine. No dangerous reaching over machine to raise or lower saw. (3) Hand measuring eliminated by use of accurate, fixed scale and stops, because saw always enters cut at same position in table, regardless of angle. (4) Saw rigid and accurate, even at most extended position. Rugged roller-bearing slide construction and take-up insure accuracy.—The American Saw Mill Machinery Co., Hackettstown, N. J.



SELF-CONTAINED PORTABLE PRE-HEATING TORCH, burns either kerosenes or light distillate and is offered for use where compressed air is not available for use in such operations as heating for welding, bending, forming, straightening, grass and weed burning, foundry cupola lighting, core patching, skin



drying, ground thawing, construction and paving. Burner said to light quickly and to burn efficiently at valve settings over wide range of tank pressures. Equipped with hand pump, filling funnel and strainer, pressure gage, oil gage and safety-automatic shut-off and valve with hose connection. Three models: (1) Smallest has 5-gal. tank, uses I gal. of fuel per hr. and is equipped with 12½ ft. of hose; (2) two largest have 12-gal. tanks, use 2½ gal. of fuel per hr. and are equipped with 12½ ft. of hose. One model has built-on truck wheels for moving; other has carrying handles—Mahr Manufacturing Co., Division of Diamond Iron Works, Minneapolis, Minn.



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### OUT IN FRONT FOR UNITED NATIONS





More materials will be hauled for 1942 war production in STERLING WHEELBARROWS than ever before in history. Sturdy old STERLINGS are being brought into service on vital war jobs... and all will perform with typical STERLING low-cost results.

Perfect balance; easy wheeling; sturdy welded steel trays with top edge reinforced by butt-welded steel rod; and many other features, put STERLING WHEELBARROWS out in front, in terms of material-transport, to advance production for the UNITED NATIONS.

STERLINGS simplify jobs today - as they have for the past 38 years.







4-TON TRAVELING RAILROAD CRANE, for use in material handling jobs in industrial plants, in construction of war plants and in placing of rails for track building, weighs 11 tons and has traction drive on all four wheels. Said to be easy to handle, to be full revolving and to swing at unusually high speed of 5.9 rpm. All controls, including brakes, are centralized at operator's position in cab.—Insley Manufacturing Co., Indianapolis, Ind.



NEW TYPE OF ASPHALT TILE, made of high-melting point asphalt and mineral ingredients reinforced with tough fibers and known as "Conductive Asphalt Tile," is said to provide surface condition which results in less than .1 megohm resistance to static electricity under certain specific conditions. Additional safety leature of flooring is that no open flames are required during installation or repair work. Especially suitable as resilient flooring in arsenals, shell and bomb loading plants, powder plants, temporary field hospitals and in various industries in which static electricity or presence of open flame at any time presents safety hazard. Supplied in tile form so that individual units may be quickly and inexpensively replaced if accidentally damaged. Claimed to be non-slip, non-dusting, non-sparking, moisture resistant and odorless. Supplied in black in following gages: 1/16, 1/4, and 1/4 in. Said to possess high tensile strength, to be comfortable under foot and not to attract vermin. Matte finish prevents glare.—Armstrong Cork Co., Lancaster, Pa.



TOXIC DUST RESPIRATOR has closely felted, laboratory-tested filler forming face piece which protects against inhalation of toxic or poisonous dusts



of lead, cadmium, arsenic, chromium, manganese, selenium, vanadium and their compounds. Face piece has cantilever edges of pure pliable rubber, sealing all leaks. Non-reversing exhalation valve said to give positive protection. Double headband of solid rubber holds respirator in place. Light in weight and providing full vision, respiratory protector is claimed to compress maximum protection area into minimum space.—American Optical Co., Southbridge, Mass.

# 2-CYCLE/DIESEL

You went from gas to Diesel to save

You went from gas to Diesel to save on fuel cost. Now you also get smooth operation, instant starting and low maintenance. You save in all ways with the 2-Cycle Diesel! Operating on ordinary Diesel fuels . . . this modern Diesel purrs along under full load as smoothly as your automobile. Because of the Unit Injection System, eliminating complicated fuel pumps and trouble-some high pressure fuel lines, fuel is thoroughly atomized, burns completely and develops maximum power. 2-Cycle power means a more sim-

ple engine . . . fewer parts; lighter parts, because there's less vibration, less shock load, less wear and tear on engine and tractor. No need to let it idle either when there's a delay. Instant electric starting saves your fuel . . . adds extra life to your engine. No matter how you look at it-cost per yard . . . cost per mile . . . fuel cost . . . operating cost or maintenance cost . . . you save with the 2-Cycle Diesel. There's less maintenance, less down time, more working time, MORE PROFITS! Today, the 2-Cycle Diesel is cutting war construction costs . . . hurrying the completion of vital contracts . . . serving on every front! Tomorrow, it will bring its thrifty advantages to every user. Get all the facts . . . Now . . . on this Diesel of the future! Write for our booklet, "Modern Tractor Power."

2-cycle The Modern Diesel Power

COMSERVE YOUR TRACTOR

Take every precention to leave your reviews in A.1 shape, if you long points.





SAND BAG FILLER permits bags to be filled by one man, thereby releasing helper for other work. Bag rests on ground while being filled so that filler may be removed without litting bag, thus making possible filling of row after row of bags around pile of sand. Saves extra labor and time required to fill bags at one location and truck them to point of use as sand may be deposited and bagged at any location.—Spinks Scale Co., 656 Maryland Ave., S.W., Atlanta, Ga.

RUST INHIBITOR FOR BLACK IRON, organic coating which can be applied economically at steel mill, may be used in lieu of oil and is said to provide protection against corrosion and to serve as prime coat for all types of synthetic and oleo-resinous coatings.—Watson-Standard Co., Pittsburgh, Pa.

BRACKETS said to be especially suited for use with scaffolds, horses, barricades for streets and highways and tables which can be knocked down, stored and moved from place to place. Also useful for construction and repairs in institutions, public



buildings and other structures where continuous maintenance is necessary. Advantages: (1) Convenience in storing; (2) cuts cost of slab floor construction in both time and material; (3) factor of safety in load will carry many times more than necessary in ordinary use; (4) relieves contractor from job of continually nailing up horses or squares which must be repaired or destroyed.—Edward B. Britten. 412 S. 7th St., Springfield, Ill.



BUILDING RUNWAYS..

Airports today, highways tomorrow—that's how it is, that's how it will be with the owners of the Rex 34-E Paver—the two-compartment drum paver that's built for speed and built to last!

WHETHER you're building a defense highway or runways for a new airport the performance of the Rex 34-E is grooved to your needs for a paver built for heavy yardage production. And in years to come it will still be the sturdy, efficient machine you want for tomorrow's jobs.

Paver owners the country over have been impressed by the Rex 34-E advantages—its positive batch transfer which is automatically controlled to a split second by the Rex mechanical man; its ease of operation which means its operator can lay down the batches where they're wanted,

the Run!

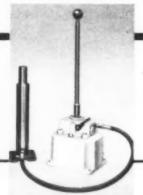
We promise you a new slant on modern paver design—a new outlook on why you should buy a paver today with an eye on tomorrow—in the book, "The Rex 34-E Duomatic Paver." If you'd like to have it, just write 1664 W. Bruce Street, Milwaukee, Wisconsin.



when they're wanted.







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 PORTABLE LIFTING POWER, where and when you want it . . . that's what you get with COMMERCIAL HYDRAULIC EQUIPMENT.

Self-contained, light weight, double acting pumps, having rams available with lifting capacities up to 1,000 lbs., these units work in any position . . . in any location. Hand activated power enables you to use them conveniently . . . few moving parts mean little or no maintenance.

Here, then, is hydraulic equipment by COMMERCIAL that enables you to economically, swiftly and efficiently handle numerous Jacking and lifting operations. Details on sizes, types and prices may be had upon request. Write!!

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# Building Hot Weather Service

ween ENGINE

 By moving a constant flow of 500 cubic feet of air per minute, at a velocity of 1000 ft. per min., at a normal engine speed of 1800 rpm. . . .

And by proportioning this large volume flow of air to suit the cooling requirements of the various parts of the engine . . . directing the air currents where

engine . . . directing the air currents where needed by means of baffle plates and airstream channels . . .



Illustrated is the Madel VE-4 V type 4-cyl engine.

Wisconsin heavy-duty air-cooled engines give efficient, reliable service at extremely high operating temperatures. Cylinders, cylinder heads, valves and pistons get all the air they need for adequate heat dissipation.

WISCONSIN MOTOR

TANK CAR HEATER connected to No. 2 Vulcan steam hammer did a satisfactory piledriving job at small original cost at a new army depot. Every 10 hr. this machine drove thirty 30-ft. wood piles



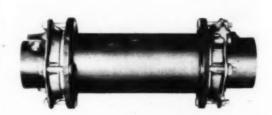
12 in in diameter at butt in spite of difficult ground conditions under which first 5 ft, were practically as hard as last. Since piles had to be driven in various locations, portability of the outlit was a most valuable feature.—Littleford Bros., Inc., Cincinnati, Ohio.



"GLASS" TUBING IN ROLLS made of transparent Tenite is available in sizes ranging from 3/16 to 3/4 in. in diameter. This seamless tubing is extruded in continuous lengths and is said to be virtually unbreakable, to be readily bent, formed and curved to fit almost any condition. Weld marks and joints are eliminated in fabrication. Ends are easily adjusted to standard flared fittings with same tools used for copper tubing. Large diameter tubing, with wall thickness of .0625 in., can be threaded with standard thread-cutting tools. Tenite tubing in sizes up to ½ in. in diameter, with wall thickness of .035 in. is stocked in long coils. Tubing more than ½ in. in diameter is stocked in 12-ft. lengths. Tubing, 1-in. diameter will be available shortly. This transparent tubing is extruded by Extruded Plastics, Inc., Norwalk, Conn., from cellulose acetate butyrate formula of Tenite, produced by Tennessee Eastman Corp., Kingsport, Tenn.—Distributors, Julius Blum & Co., Inc., 532 W. 22nd St., New York City.



BOMB CRATER CLAMP, for use in repairing water mains in case of explosion, is said to make tight, lasting connection between ends of broken main and piece of steel pipe cut to proper length to fill space. New adapter makes use of bell joint



clamp parts to splice desired length of steel pipe to fill in gap in broken main with minimum delay. Photo shows how connection is made between main and steel pipe at each end of gap. Left end makes connection with main; right end connects with steel pipe. Note how flanges welded to center tube act as anchor rings for bolts.—M. B. Skinner Co., South Bend, Ind,

Keep Em Running!



To keep the enemy on the run, it is imperative that we keep our fighting forces supplied with all necessary equipment. Enormous quantities of steel are required for guns, planes, tanks, ships and shells. The more service you can get out of your wire ropes, the more steel you save for these other vital purposes.... So, the longer you can keep your ropes running, the faster will be the flight of the foe.

Whether or not a wire rope gives the full service of which it is actually capable, depends largely upon the conditions under which it is required to work—unfavorable or improper conditions mean shorter life; to save steel, give your ropes the same kind of a chance you are now giving your tires.

For the benefit of all wire rope users we have published a 44 page illustrated booklet entitled, "Practical Information on the Use and Care of Wire Rope". It contains information that will help all wire rope users get more "work hours" from every pound of their wire rope steel. We shall be glad to supply a complimentary copy upon request.

Another important factor in getting maximum service from wire rope is the use of the correct grade, construction and type. On all problems of this kind, feel free to consult our experienced Engineering Department.

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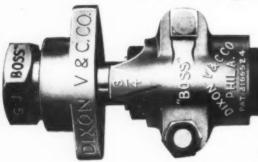


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"GJ-BOSS"

GROUND JOINT

### AIR HAMMER COUPLINGS

Compact Type, Style XLB-61,  $\frac{1}{2}$ " and  $\frac{3}{4}$ " Heavy Type, Style XHB-72,  $\frac{3}{4}$ " and 1"

Washerless, leakproof couplings, with a reputation for reliability and economy on rock drills, paving breakers and other pneumatic tools. Ground joint construction provides permanent soft-to-hard metal seal—no delays due to washer replacements. Tight-gripping, correctly designed "BOSS" Interlocking Clamp eliminates danger of blow-offs and conserves rubber by actually protecting hose ends.

Carried by Leading Rubber Manufacturers and Jobbers

VALVE & COUPLING CO.

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BRANCHES CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

# NEWS FROM MANUFACTURERS About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

BLUE PRINT READING—Lincoln Electric Co., Cleveland, Ohio (second edition, 146 pp.,  $5\frac{1}{2}$ x8 $\frac{1}{2}$ z, in.; 96 drawings.) Edited with special reference to welding, book is concisely written in simple, practical language so that welders, mechanics and others interested in the subject may learn print reading in few hours. More than 50 revised and 8 pp. of new drawings. Text gives students clear understanding of symbols used in drawing various types of welded joints, including butt, corner, fillet and lap. Illustrations include practical examples of drawings and number of machine parts, pipe connections and general construction tanks. List of questions and answers permit students to test his knowledge. Book also covers essentials of general blue-print reading such as "showcase views," perspective drawings, "line of sight" projection of views and line "al-phabet."

ELECTRIC TOOLS — FOR CONSTRUCTION, INSTALLATION, PRODUCTION AND MAINTENANCE — Wodack Electric Tool Corp., 4627 W. Huron St., Chicago, Ill. (8 pp., illustrated). Pictures and gives specifications for various models of portable electric drills. Combination electric hammer and drill, electric wragler, plaster cutter, portable sander and grinder, "Do-All" disk sander or edger, electric grinders and accessories for all types of Wodack electric tools.

TRAVELING ROAD MIXER — Wood Manufacturing Co., 208 West 8th St., Los Angeles, Calif. (12 pp., illustrated.) New bulletin on Wood Roadmixer de-

scribes use of tractor-drawn traveling mixing machine on highways and airports for construction of stabilized bases and bituminous mats. Booklet describes one-pass mixing of aggregates and soils with various liquid binders and gives data on productive capacity, typical jobs, synchronization of mixing and travel speeds, controlled proportioning of liquid binder, on through gear reduction power

power transmission through gear reduction power take-off on standard crawler tractor, and other features of portable traveling mixer unit.

\* \* \*

ROOFING AND SIDING—Levinson Steel Sales Co., 33 Pride St., Pittsburgh, Pa. (10 pp., illustrated.) Engineer's handbook on asphalt-protected steel roofing and siding gives available sizes of corrugated and flat sheets and provides fastener and flashing drawings, instructions for estimating job requirements and tables for computing sheet coverage.

BLASTERS' HANDBOOK — E. I. du Pont de Nemours & Co., Wilmington, Del. (340 pp., illustrated; price \$1.) The eleventh edition of "Blasters' Handbook," completely revised and expanded, contains latest information about all types of explosives, blasting agents, supplies and accessories, and covers blasting techniques for principal industries using explosives. First published in 1918, handbook now makes its appearance in enlarged and completely revised form at time when need for efficient blasting and trained blasters is more urgent than ever before. Some of practices recommended in this eleventh edition are at variance with those described in previous editions. Experience indicates that modified practices recommended in this latest edition of handbook will make for improved performance.



# FASTER, SURER PRIMING SPEEDS UP WORK!

On the job performance proves that DOUBLE PRIMING, exclusive with CMC speeds priming as much as six times. Yes, any CMC delivers full capacity far quicker than single priming pumps. Renewable Impellers and wear plates add years to their life. Sizes 1½ to 10°...a complete line.

New Special CMC Pump Catalog Now Ready. Write for your copy!

#### CONSTRUCTION MACHINERY CO.

WATERLOO, IOWA



MIXERS . PUMPS . HOISTS BATCHING & PLACING EQUIP. SAWS . CARTS . BARROWS

### It Makes No Difference

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### COFFING HOISTS

Or Hoists of Another Make
IT'S UP TO YOU TO

#### Help Win This War

By giving your hoisting equipment proper care. Hoists are made to assist you in speeding up your production, construction, materials handling and maintenance work. See that your hoists are well lubricated at all times. Protect them from dust, dirt and moisture that causes deterioration. Above all, don't abuse hoists with extreme overloads. Repairs require time and labor and during these busy times parts are not always available. So let us repeat: Take the best possible care of your hoists during this emergency.

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

Ratchet Lever Hoists Spur Geared Hoists Electric Hoists

Write for Free Catalog Number DG-6



- loads delivered each pass;
- 2. Inserted teeth and cutting lip are angled for easy penetration, and consequent fast filling;
  - 3. Flared body and curved door shed
  - 4. Braces permit easy adjustment to When you have a shovel job that demands big output fast, find out the full story
- 7. Protruding lip cuts clearance for dipper body, increasing filling speed,
- 8. Cross-sectional shape conforms to flow and pack of material, reducing voids, increasing pay load.

on Bucyrus-Erie dippers.



Power alone can't do the job. - Smooth, dependable transfer of the power and correctness of design of the construction machine are the factors that insure more yardage - every day.

Builders of equipment and their design engineers have justified their preference for DIAMOND Roller Chains by reason of operators' reports covering many years of field performance of every kind of equipment: - excavators, trenchers, graders, cranes. road patrols, tampers, finishers, scrapers, loaders and conveyors, hoists, dump trucks, asphalt plant machines, concrete mixers

DIAMOND Roller Chains provide positive, non-slipping drives. - have the reserve power to withstand the hard gruelling work that the construction industry encounters. Diamond engineers have done much in cooperation with machinery engineers to improve all-over efficiency, reduce delays and replacements, and maintain high daily yardage. Like the builders, experienced construction firms and operators list Diamond Roller Chains as their first choice. DIAMOND CHAIN & MFG. CO., 418 Kentucky Ave., Indianapolis, Indiana. Offices and Distributors in All Principal Cities.



gram and the manufacturers can well be cited for their part in the big job of winning the war.

CONCRETE SPREADER—Jaeger Machine Co., Columbus, Ohio. (8 pp., illustrated). Folder illustrates and gives specifications for screw concrete spreader built in two sizes, one adjustable for 10-14-ft. lanes and second adjustable for 20-25-ft. pavement. Photographs and data indicate capacity of machine to spread large volume of concrete on both one- and two-course construction,

REPAIRING BOMBED PAVEMENTS— The Asphalt Institute, 801 Second Ave., New York, N. Y. (8 pp.) "Specification for Stock-Pile Asphalt Mixtures for Making Quick Repairs of Bombed Surfaces" contains two main divisions, one on materials and the other on preparation and composition of mixture. Latter division covers mixing by stationary plant, travel plant, or road blade and drag. Specification is designated CP-1.

CONVEYOR BELT MAINTENANCE - B. F. Goodrich



CONVEYOR BELT MAINTENANCE — B. F. Goodrich
Co., Akron, Ohio. (24 pp., illustrated) Booklet on
Care and Maintenance of Conveyor and Elevator
Belting discusses: (1) wear
at loading points; (2) use of
notched chutes, baffle bars
and special impact idlers to
reduce wear; (3) design of
skirt boards; (4) protecting
belts from trapped lumps; (5)
saying wear by speed regula-

belts from trapped lumps; (5) saving wear by speed regulation; (6) making conveyor belts run straight; (7) defective idlers; (8) idler spacing; (9) belt tension; (10) belts on portable conveyors; (11) effect of light, heat and moisture; (12) vulcanized splices; (13) belt repairs; and (14) proper use and care of bucket elevator belts. Included is a section on conveyor belt design with tables; and formulas to aid veyor belt design with tables and formulas to aid in calculating requirements and selecting belt to meet them.

PAPER TUBES FOR PIER FORMS — Sonoco Products Co., Hartsville, S. C. (6 pp., illustrated.) Folder describes spiral-wound laminated paper tubes used to form concrete piers on cantonment-type building projects. Tubes come in three diameters, 9 to 13½ in., and in lengths up to 24 ft. They are cut with hand or power saws on job to fit various heights of concrete piers. Strong enough to stand knocks in handling and concreting they are oil-treated on inside to facilitate stripping from pier, or they may be left in place to slough off.

CARE OF RUBBER HOSE -The Manhattan Rubber Mig. Division of Raybestos-Manhattan, Inc., Passaic, N. J. (Two wall cards, each 84x11 in., with eyelets for hanging) One card lists rules for proper care of air, water, steam and other types of hose and for proper attachment of couplings. Second card details proper care of fire hose

AIR-DRIVEN CORE DRILL—E. J. Longyear Co., Foshay Tower, Minneapolis, Minn. (4 pp., illustrated.) Bulletin describes two-purpose air-driven diamond core drill which may be used also for blast hole drilling, either with a safety chuck or by means of simple adapter for connecting drill rods to feed screw. Feed screw and air motor form an integral unit, utilizing full power of motor. Holes may be drilled at any angle in underground operat. an integral unit, utilizing tall power of motor, roles may be drilled at any angle in underground operations. Made in two sizes: Model 15 has capacity of 500 ft. for core drilling, and Model 30 will drill 250 ft. Both models recover %-in. core. Blast holes 1 3/16 or 1½ in. in diameter may be drilled 100



EQUIPMENT Investigate the Complete Line of Heil Road Machinery for Every Type of Dirtmoving Job

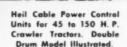
> In the complete line of Heil Earthmoving Equipment you will find the proper unit to give you faster, more profitable operation on every job you encounter. Heil Earthmoving Equipment and Heil Hydraulic Dump Units are designed by experts to give you fast dependable operation with

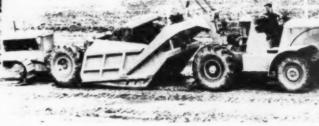
a minimum of maintenance and service expense.

Contractors using dependable Heil dirtmoving units recognize that Heil design and construction assures them increased hourly production and lower operating costs. Find the profitable answer to your

dirtmoving problems . . . See your nearest Heil distributor today about Heil Twin-Cable Scoops - Heil Hi-Speed Tractor-Scoops — Heil Power Control Units — Heil Hydraulic Scoops — Heil Trailbuilders and Bulldozers - Heil Tamping Rollers - and Heil Hydraulic Dump Units.







Heil Hi-Speed Tractor-Scoop. 150 H. P. Heil Rubber-Tired Tractor and 15 Cu.Yd.



FOR THE DURATION

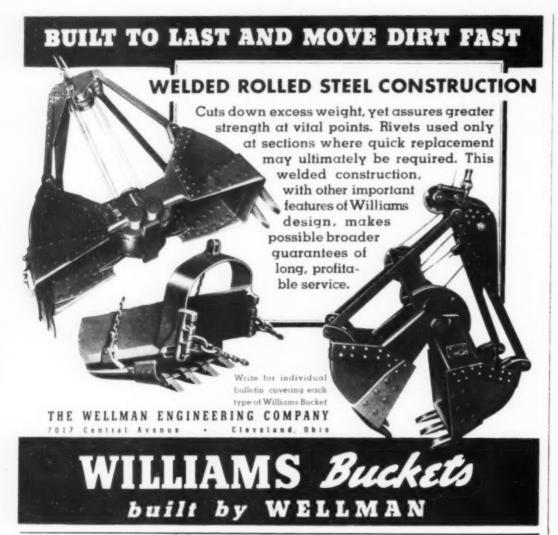
Because it has become increasingly difficult to get new Roadbuilding Equipment, it is your patriotic duty to keep your present equipment opthe service facilities of your Heil Distributor who will help you "Keep Em Rolling" for Uncle Som



Heil Hydraulic Trailbuilders and Bulldozers Give you Fast Dependable Service

THE FILE CO. MILWAUKEE, WIS.

MAIN OFFICES





Because of special features resulting in high mobility, Le Roi Compressors have won a reputation - for themselves and for users-of fast, on-time performance. Heavy-duty valve-inhead engine - built by Le Roi, the only manufacturer who makes both engine and compressor - keeps costs

down, assures minimum interruption of service. Easily accessible for quick adjustment, easy repairs. Removable cylinder sleeves and many other features. Write for information describing models currently available for your class of war construction.

LE ROI COMPANY . Milwaukee, Wisconsin

### Resin in Cement Reduces Scaling of

Concrete Highways

THE SERIES OF STEPS leading to the elimination of scaling of concrete highways from freezing and thawing has finally been completed through the dedication to public use by Hercules Powder Co. of the patents covering the use of Vinsol resin in cement, the company announced recently.

The resin is used in cement to reduce surface scale and almost completely eliminate progressive scale, the company says. Laboratory and field tests have determined that additions of extremely small quantities of "Vinsol," in the range of .03 to .05 of 1 percent to highway cements would produce concrete highly resistant to frost action.

Through the cooperation of the Portland Cement Assocation and highway boards of many states, field test data have been developed which have led many cement manufacturers to adopt the resin for their cements.

Vinsol resin, a pine wood derivative, has been generally adopted because it can be incorporated in the cement at a cost of a fraction of a cent a barrel of cement. Action of the company will make it possible for cement manufacturers to make the material an ingredient of their cements without payment of royalties.

# Blackout and Camouflage Paints

DEVELOPMENT OF A COMPLETE LINE of blackout and camouflage paints to meet the current war emergency has been announced by the Paint Division of the Pittsburgh Plate Glass Company.

The paints are designed for domestic and commercial use in areas subject to possible air raids. They obscure interior illumination when applied to windows, skylights, and other glazed openings.

The blackout and camouflage paints have been developed in four principal colors: black, smoke gray, earth drab, and neutral brick. By using the color that more nearly blends with the surrounding exterior building or terrain, a partial camouflage is effected in daytime in addition to providing blackout protection during the night. In cases where a complete blackout is desired the outside of the window is covered with one coat of blackout paint

(Continued on page 100)



PRE-CUTTING STAIR STRINGERS at an Army camp with famous Black & Decker No. 85 QUICK-SAW. One of four powerful, lightning-fast models, with depths of cut from 1½%" to 3½%".

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HEAVY CONSTRUCTION TIMBERS bein quickly cut with Black & Decker husky No 95 Electric Saw. This model has amp power and extra depth of cut to zip through toughest lumber in seconds.



SAWING 50 RAFTERS IN 45 MINUTES with Black & Decker Electric Saws on a large construction project. An example of how these fast saws step up cutting on any type operation.



SAWING FORM PANELS for concrete foundations with Black & Decker Electric Saws. They also clip time from sawing scaffolding, falsework and other similar construction jobs.

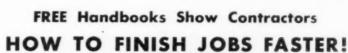
# SPEED CONSTRUCTION SCHEDULES ☆ FOR UNCLE SAM ☆

# with BLACK & DECKER Portable Electric Tools!

BLACK & DECKER Electric Tools help contractors break records on every type of war construction—industrial expansion, military and naval projects. Black & Decker Electric Saws zip through lumber ten times faster than by hand. They make rip, cross and angle cuts. They're kept safe by instant-acting, ball-bearing telescoping blade guards.

Smashing thousands of sledge-hammer blows a minute, Black & Decker Electric Hammers knock hours from jobs requiring brute pounding action. They drill in concrete and stone — shape or gouge timbers.

Husky Black & Decker Electric Drills quickly bore wooden timbers and metal fastenings, to speed up heavy frame construction. Black & Decker Electric Tools plug in any light socket or portable generator. They're powered to take the tough spots without overheating or slowing down—are engineered to deliver long, efficient service. Phone your jobber to demonstrate the Black & Decker Electric Tool you need—or write for information today.





Send for the building Handbooks you need, showing dozens of construction applications of Black & Decker Portable Electric Tools. Pin coupon to your letterhead and mail to The Black & Decker Mfg. Co., 759 Penna. Ave., Towson, Maryland.



TO SPEED SCHEDULES in building Ft. Lewis, Wash., Black & Decker Heavy Duty Electric Drills were used by Timber Structures, Inc., Portland contractors, for fabricating heavy timber roof trusses.



CUTTING OPENING IN CONCRETE with husky Black & Decker Electric Hammer and web tool. They also vibrate concrete and drill rock for "pot shoes." Four models—1/2" to full 2" capacity.



DEMOLISHING WALLS with powerful Black & Decker Hammer and bull point. This and other brute work requiring harditting hammering action is done quickly and easily with B & D Electric Hammers.

Black & Decker

PORTABLE ELECTRIC TOOLS

GENERAL	TOOL	CATALOG

☐ HAMMER HANDBOOK

SAW HANDBOOK

and the inside with a standard interior paint.

Because of the danger of glass breakage by absorption of sun radiation by painted glass, the following recommendations have been made. (1) The entire pane of glass should be covered. (2) Only one coat of paint should be used on the exterior. (3) A black paint gives the greatest opacity but also shows the greatest heat absorption. Whenever possible, particularly on southern exposures, more neutral colors should be used. (4) The danger of breakage is minimized when paint is applied to glass areas of 4 sq. ft. or less.

## Galvanized Nails For Outside Jobs

EVERYBODY WHO KNOWS how quickly plain shingle nails rust and crumble away in the weather is also aware of the advantages of hot dipped galvanized nails for outside jobs.

Hot dipped galvanized nails will not rust, and because of the slight roughness of the zinc film which covers them do not pull out readily. Hence they give a more secure job.

During the present emergency allocation of such metals as zinc away from ordinary uses, it is interesting to note that there is a process for dipping nails which does not require material of a metal nature. A synthetic resin treatment called "reziting" now gives nails a protective coating which serves the same purposes as the galvanize dipping. Rezited nails are rustproof and hold on to the wood with the tenacity of galvanized nails.

The reziting process is claimed to be in no way obnoxious or toxic to workers who are accustomed to put nails into their mouths on the job.

### Employees' Hospital Incorporates Company Products

UTILIZING ITS OWN PRODUCTS for exterior-wall sheathing, ceiling insulation and interior wall finish, the Masonite Corp. has completed at Laurel, Miss., a 35-room hospital, 87x67 ft. in outside dimensions, to house its clinic for employees and their dependents. Built and equipped at a cost of nearly \$60,000, the hospital has a brick and glass-block exterior and modern mechanical features such as air conditioning and fluorescent lighting. Dubblseal sheathing was incorporated in the outside walls, 3-in. insulation was used for the ceilings, and hardboard products were applied to interior walls.



While today for your

free copy of Catalog 200,

a 68-page, fully-illustrated

data book on Jacks.



"I CLAIM Tre got the toughest job in the world for Diesels! At the F. E. Reed Glass Co., manufacturers of all types of glass containers, in Rochester, N. Y., we have 5 Ingersoll-Rand Diesels, and boy do they work! 24 hours a day—seven days a week—at peak capacity! And do you know something? Since we discovered a certain oil, in 14 months we haven't had a stuck ring or valve. In 50,000 hours of operation we haven't had anything but perfect lubrication! Top that, my friend."

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"OKAY, BOTTLE! Down in West Virginia where I hail from, the Pittsburgh-Weirton Bus people travel their buses over mountainous country. Toughest going you ever saw. They've covered more than 500,000 miles of it, too! And since we discovered our secret we've been able to more than double the time between oil changes. Rolling 21 hours a day, in low gear almost all the way, our engines are cleaner than ever, bearings in topnotch condition, rings free!"

BOTTLE: "Sounds almost unbelievable, Brother Bus! I don't see how you can do it—unless you use the same oil we do ... RPM DELO."

BUS: "I do, Brer Bottle! Indeed, my boss wouldn't think of using anything else but RPM DELO. Fact is, I can't see why anybody should use anything else,"



STANDARD OIL COMPANY OF CALIFORNIA

#### ORDER RPM DELO FOR YOUR DIESELS

RPM DELO is marketed under the following names:

Caltex RPM DELO · Kyso RPM DELO · RPM DELO · Signal RPM DELO · Sohio RPM DELO
Imperial-RPM DELO
CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.



LOOK TO BYERS EXCAVATORS FOR

e, two or three shifts



pendent travel feature! A Byers crane or drag pendent travel feature! A Byers crane or drag-line is always ready to move on its crawlers instantly... at the touch of a single lever... because flow of power is direct from motor to each working operation. (Byers excavators do not travel on their swinging mechanism.) This time saving feature is another reason why you should investigate Byers cranes and dragline in sizes through ¾ yd.





GORDON' SMITH & CO., 480 College St., Bowling Green, Ky.

Long Pipe Line CROSSES SEVEN STATES (Continued from page 68) rivers, hundreds of highways and railroads and numerous towns, villages and small private properties. Tractor-bulldoz-

ers opened up a 30-ft.-wide route, often through dense woods and hilly terrain, for the delivery of pipe and for access of construction equipment, including trucks, trenching machines and welders. Pipe was delivered to the job in 40-ft. lengths which received a protective coating of asphalt enamel wrapped with felt

before being placed underground in a trench that was dug by machine to a minimum depth of 3 ft, and backfilled by a scraper operated from a side boom on a tractor. After welding in long sections, actual pipe laying was done with side-boom tractors. Most of the specialized pipe-line construction workers hailed from Oklahoma. Texas and Louisiana and some veterans had seen foreign service in Iran. Iraq, and Venezuela,

# Toothed Bulldozer Blades

#### Speed Land Clearing

(Continued from page 66)

shown in the accompanying illustrations. The teeth of this blade are of 2-in. armor plate, spaced 1114 in, apart. This toothed blade may be mounted on an ordinary bulldozer in place of the regular blade. The teeth are tough and big enough to stand a lot of punishment.

Frank H. Cole, logging contractor of Colville, Wash., equipped two of his International TD14 diesel tractors with these land-clearing dozers and did a quick job of clearing 50 acres of land for Gib Gillson, also of Colville, at a cost of about \$15 per acre. Working in a veritable wilderness, the tractor cleared the land of weed or trash trees up to 1 ft. in diameter, consisting mostly of poplar and bull pine. First, the trees were knocked down and then worked into windrows 75 yd. apart. A final combing operation, as shown in one of the illustrations, brought out all small roots and branches free of dirt to the windrow for easy burning. After burning, the land was ready for plowing and seed-

na

be

her

On a land-clearing job along the Columbia River another International diesel TD-9 unit, equipped with a similar landclearing blade, was used to remove stumps. trees and roots along relocated railroad

right-of-way in the area to be flooded by the reservoir formed by Grand Coulee Dam. The tractor is owned by Porter Carter, of Colville, who had a contract to clear 131/2 mi. of right-of-way which averaged in width from 90 to 160 ft. and which totaled about 285 acres. Cost of clearing per acre averaged \$35.

#### Housing Site Cleared

The Port Investment Co., of Portland, Ore., made use of a TD-14 tractor fitted with an Isaacson land-clearing blade on a 139-acre housing development near Portland. The land, which is on the edge of Tualatin River Valley, had been logged off years ago and many large fir stumps and old fir snags 5 and 6 ft. in diameter, besides a heavy growth of brush and secondgrowth fir trees up to 28 in. in diameter, were removed. In the initial job of clearing about 20 acres the tractor, equipped with straight blade dozer, was also used to excavate basements for thirty houses and to construct a mile of road.

## On-the-Job Maintenance **Extends Service Life** Of Hose

(Continued from page 54)

a distance from the original cut.

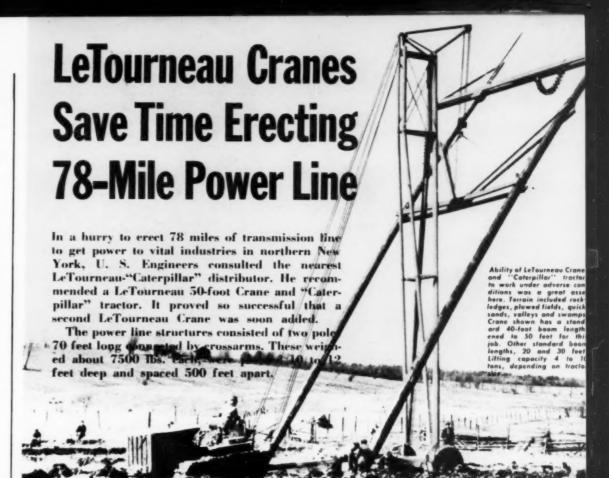
Many ingenious tricks are being adopted these days to protect hose. As one example, an old wagon wheel has been covered with sheet metal and mounted on a piece of pipe driven into the ground. The covered wheel makes a revolving table on which long lengths of air hose or water hose are coiled and kept high and dry. When the sohse is needed, it can be uncoiled in a jiffy without twisting or pulling the loops into kinks.

Where water or air hose must cross the path of rolling equipment, the careful contractor cuts a groove in the ground where the hose can lie and the equipment can pass over without harm. Or, planks may be laid on each side of the hose to permit trucks and other vehicles to jump the hose. On one job which comes to mind, the hose was run through large-diameter iron pipes, which were lying around unused, to guard against truck wheels.

#### Special Types of Hose

Certain points should be observed when using special types of rubber hose. Some of the more important points are given

Welding Hose - Keep hot flying par-(Continued on page 104)



#### SAVES \$50 PER STRUCTURE

To save assembly time, structures were put together on the ground. The assembled structures made awkward loads to handle, but LeTourneau Cranes proved just the ticket. As shown, a single Crane was enough to raise and place a structure. Engineers estimated the LeTourneau Cranes saved \$50.00 per structure in erection costs.

#### SCORES OF USES

You, too, will find LeTourneau Cranes a handy, time and money-saving unit for erecting structures and heavy machinery, loading and unloading supplies, lifting,

carrying and spotting awkward loads, Le-Tourneau Tractor Cranes operate from any track-type tractor equipped with Le-Tourneau 2-drum Power Control Unit. Quickly attached or detached in 15 to 20 minutes, leaving tractor free for drawbar work, Carryall Scraper, Dozer or Rooter operation. Made in several sizes, models and capacities-see pictures here.

Like practically all construction equipment, LeTourneau Crane orders are subject to the latest WPB regulations - your LeTourneau-"Caterpillar" distributor will gladly help you apply for ratings. Make him your Victory Construction Headquar-

this Crane, because of its long boomhead, can lift and carry 20,000 tical lift of 20 feet.

marily for handling crashed planes, as L-20, but has 40-foot vertical lift. De- capacity, 14.3 m.p.h. travel speed. veloped for loading and unloading planes. Operates over concrete, macadam and and supplies at decks and railway sidings floorings without damage to surface. pounds 20 feet out from wheels with where handling facilities are limited. For Built with 20-toot boom which can be boom in upright position. Has a ver- heavier loads, use L-41 Crane — it looks lengthened to 30 and 40 feet by boltvery much like L-40, but has a ten-foot ing in additional 10-foot sections. reach and will lift up to 40,000 pounds.

L-20 Tractor Crane—Developed pri- L-40 Tractor Crane—Same 20-foot reach Tournacrane—20,000 pounds lifting

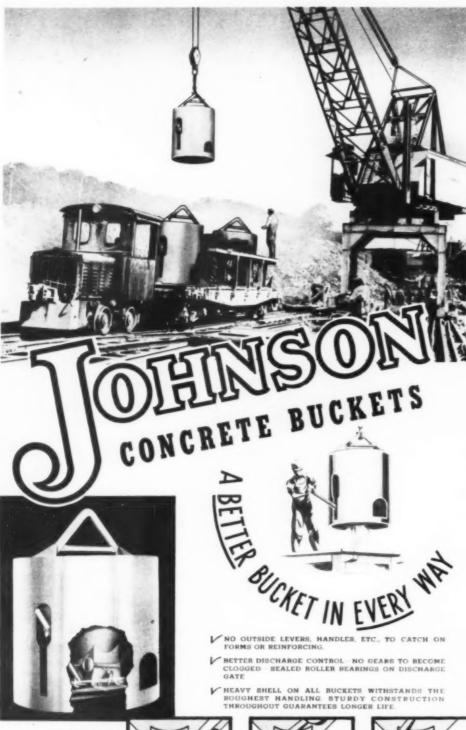






Manufacturers of DOZERS, CARRYALL\* SCRAPERS, POWER CONTROL UNITS, ROOTERS\*, SHEEP'S FOOT ROLLERS, TOURNAPULLS\*, TOURNAROPE\*, TOURNATRAILERS\*, TOURNAWELD\*, TRACTOR CRANES.

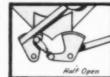
\*Name Reg. U.S. Pat. Off.

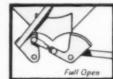


Cutaway view above shows discharge gate of 1/2 and 1 cu. yd. Johnson bucket. Operation of counterweighted gate, in steps, illustrated at tight.

Cutaway view, below, shows discharge gate of the Johnson - Dravo 2, 3, and 4 cuvd bucket.







JOHNSON ½ AND 1 CU. YD. CONCRETE BUCKETS are constructed to withstand the most punishing usage. Vertical sides and steep cone assures fast and complete discharge. Concrete, dropping first at center line, causes re-mixing while discharging. Grout tight gates are double clam type—operated by toggle lever—have anti-friction needle bearings with grease retainers making quick cut-off and easy discharge control positive.

JOHNSON-DRAVO 2. 3, or 4 CU. YD. CONCRETE BUCKETS

combine simple control—fast discharge with the sturdiest, most durable construction. Roller-bearing, jam-proof, radial type gate overlaps the lip of the discharge opening when closed to provide a leak-proof seal—drops away and eliminates binding or wear during discharge operation. Counterweighted, dual discharge wheels on 3 and 4 yd. buckets.



CHAMPAIGN . C.S. JOHNSON CO.

ILLINOIS

(Continued from page 103)

ticles away from the hose. Avoid shutting off oxygen and acetylene by kinking the hose.

Sand-Blast, Concrete-Placing and Material Hose—Any hose carrying highly abrasive mixtures should be kept in as straight a line as possible. Sharp bends cause abnormal internal friction and wear. Concrete-placing hose should be rotated by quarter turns at regular intervals to permit equal wear all around the tube.

Air Hose—Be sure the hose construction you use is heavy enough for the pressure. Bursting air is the most dangerous type of hose burst, Don't try to substitute a water hose on a big air compressor with the mistaken idea you are saving anything. You're just running a wasteful risk.

Check your air compressors periodically and drain off the excessive oil that accumulates in the compressor chambers. A great amount of air hose is ruined by internal ply separation caused by hot oil which backs into the hose and swells the tube until it cracks and lets the oil attack the braid or duck. If you have air tools that must be lubricated through the hose, buy an oil-resisting tube construction. Wash out air hose after service to remove excess oil. Use an aftercooler on portable compressors.

Steam Hose—Get the best your money can buy and be sure it's heavy enough for the job. Do not lubricate a steam hammer through the hose. Install oil cups on the hammer.

#### **Balanced Hose Construction**

For years, progressive hose manufacturers have preached the merits of balanced construction, so engineered that tube, carcass and cover wear simultaneously, to the end that two perfectly good elements never have to be discarded because a third element is worn out. The principle applies very clearly in today's efforts to make hose last longer to save rubber. Don't allow some small cut, or an excessively sharp bend, or internal misuse to ruin one part of the hose and render the other parts useless even though they may be still as good as new. The rubber industry has to stretch its stockpile "a mile," and every pound of rubber that construction men can save will literally help cushion the impact of the war.

Some excellent publicity has been given to the fundamental do's and don'ts on caring for various types of hose. A series of cartoons accompanying this article will serve to review the points every hose user should keep in mind. The following basic points are easily remembered and will add extra service to your hose:

1. Don't use a light fabric hose where the pressure requires a heavy construction.

Apply the proper couplings carefully.
 Avoid sharp kinking under high pressures.

4. Do not keep hose under pressure when it is not in active service.

(Continued on page 106)

# "KNOW-HOW" that's the secret!

Let the International Industrial Dealer Help You Get Maximum Output from Your Equipment



KNOW-HOW" for Airports



KNOW-HOW" for Industry





WE talk about International Industrial Power dealer "know-how", we mean the dealer's broad knowledge of construction methods and equipment and his application of that knowledge to your particular problems.

"Know-how" means recommending the right sizes and types of tractors and engines for your specific jobs. It means a knowledge of allied equipment and how to coordinate that equipment most efficiently with International TracTracTors, Wheel Tractors, and Power Units.

The dealer's "know-how" has its foundation in International Harvester research, engineering, and manufacturing—a foundation on which he has built, with his own experience, a background of practical power information. He can give you sound, money-saving ideas on the best equipment to use, the best way to cut operating costs, the best way to get jobs done, the best way to get maximum output from your equipment in these times when every minute and every machine counts.

Add his knowledge and experience to your own. Then you will have a combination that will help you get the most out of your equipment... and help WIN THE WAR!

INTERNATIONAL HARVESTER COMPANY

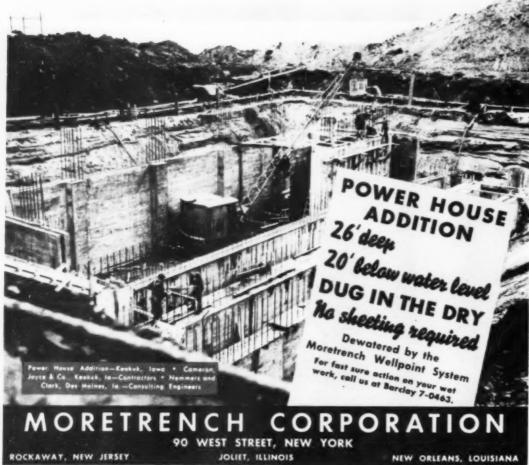
180 North Michigan Avenue

Chicago, Illinois



INTERNATIONAL Industrial Power

### 30 Feet Away - The Mississippi River!





(Continued from page 104)

5. Keep hose away from steam pipes.

#### **Need for Conservation**

"Is all this rubber conservation really necessary" you may ask. Well, here are the facts (all figures approximate):

Rubber on hand January 1, 1942 Rubber to be produced in 1942	750,000 ton 450,000*
Rubber to be produced in 1943	450,000
	1,650,000*
*Including estimated synthetic production. Rubber to be used in 1942	
	400 000
Military use only	400,000
Trucks	200,000
Our allies	265,000
	865,000
Rubber to be used in 1943	
Military use only	600,000
Trucks	165,000
Our allies	265,000
	1,030,000
Total tons required for next two years	1,895,000
Total tons on hand and to be produced	
for next two years	1,650,000
Estimated rubber shortage at the end of 1943	245,000

It must be emphasized that the figures in the above estimate do not include civilian requirements.

# Electric Eye CONTROLS MUCK TRAINS

(Continued from page 39)

or locomotive enters the block and interrupts the light beams directed on the first relay, there-is no reaction, as this relay controls the already lighted green lights. When the light beams directed on the second relay are interrupted, however, the green lights are extinguished and the red lights turned on. The reverse happens when the train emerges from the other end of the block,

Signal systems for three blocks have been in operation for several months on the east end of the tunnel. The west end will soon be similarly equipped, to make this the longest tunnel in the world protected by photoelectric block signals.

#### Irrigation and Power Project

When completed, the \$50,000,000 Continental Divide tunnel will bring water from the western slope of the Continental Divide to the eastern side, where it will be used for irrigation. In addition, power will be developed by the installation of turbo-generator units at strategic points. The project is under the direction of the U. S. Bureau of Reclamation.

The S. S. Magoffin Co., under the direc (Continued on page 108)

EXPERIENCE BUILDS 'EM

# New Help for FASTER LOADING!

# Atlas "REDI-SLIT" Cartridges



111

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10

An Atlas "REDI-SLIT" cartridge as it comes from the case



The same "REDI-SLIT" cartridge after loading and tamping.

Where "Better Blasting" demands maximum loading density, Atlas "REDI-SLIT" cartridges become a real aid toward faster, more efficient loading. "REDI-SLIT" cartridges do away with the need for tedious hand-slitting necessary to compact the charges by tamping in rock that's hard to shoot, or in upwardpitching holes.

Just load, tamp-and Atlas "REDI-SLIT" cartridges stay put—expanded so they pack neatly and firmly in the back of the bore hole!

Because all "REDI-SLIT" cartridges

are slit in exactly the same way, they give uniform results. They will save loading time, and improve the efficiency of your blasting. Ask the Atlas Representative to demonstrate how "REDI-SLIT" cartridges can help in your operations.

## Atlas "REDI-SLIT" Cartridges

- ... expand easily to fill the bore hole.
- . prevent spilling of powder during han-
- dling and loading.
- ... maintain the moisture protection of the
- .. make modern, economical explosives practical in upward-pitching bore holes.
- ... save money and speed production.

**EXPLOSIVES** "Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco

# TAKE THIS PRESS RIGHT TO THE JOB . . . IT'S Portable



# VULCAN Portable Hydraulic PRESSES ARE INDISPENSABLE

# IN THE SHOP AND ON THE JOB

and can be adapted to many uses on construction projects such as for gears, sheaves, wheels, crank discs, and crank pins.

Use it indoors or outdoors. Supplied with a lifting chain, it can be quickly slung up and taken down.

All brass pump plus simple, sturdy construction assures trouble-free long life. The gauge is graduated, indicating the total tons on the ram as well as the pounds pressure per square inch.

# VULCAN Portable Hydraulic PRESSES

are available in 60-ton capacity, 6-in. ram diameter, 850 lbs. standard bars, and in 100-ton capacity, 7½-in. ram diameter, 1550 lbs. standard bars. Quotations will be given on special side bars.

Write for Bulletin No. 10

### VULCAN IRON WORKS

331 North Bell Avenue

Chicago



Illinois

(Continued from page 106)

tion of Frank Purvis, construction engineer, is drilling the east side of the tunnel. The west side is being drilled by the Stiers Brothers Construction Co., under the direction of "Long John" Austin, who recently broke two world records in driving the Carlton Tunnel in Colorado's Cripple Creek mining district.

# Beautiful Bridges RECEIVE AWARDS

(Continued from page 51)

fourth class for purposes of the award. CLASS A AWARD, RAINBOW BRIDGE — Over Niagara River, Niagara Falls, N. Y. Total cost, \$4,000,000; Engineers, Waddell & Hardesty and Edward P. Lupfer Corp.; Architect, Aymar Embury II; Fabricators and erectors, Bethlehem Steel Co.; Owner, Niagara Falls Bridge Commission; Main span, hingeless arch. 960 ft.

CLASS C AWARD, FAIRMOUNT BOULEVARD BRIDGE — Hunting Valley Village, Cuyahoga County, Ohio; Total cost, \$114,000; Engineer, John O. McWilliams, County Engineer, Cuyahoga County; Fabricators, Fort Pitt Bridge Works; Owners, Board of County Commissioners of Cuyahoga County; Span length, 236 ft. (3-span continuous deck plate girders).

MOVABLE BRIDGE AWARD, PAS-SAIC RIVER BRIDGE — State Highway Route 25 (Lincoln Highway) between Newark and Kearny, N. J.; Total cost, \$2,055,498.47; Engineers, Morris Goodkind, bridge engineer, State Highway Department of New Jersey; and Howard Needles, Tammen & Bergendoff, consulting engineers; Fabricators and erectors, American Bridge Co.; Owner, State Highway Department of New Jersey; Span lengths; Lift span, 332 ft. 6 in.; approaches, 1,772 ft.

# New Window Sash SAVES STEEL

(Continued from page 50)

zontal supporting members, allowing maximum light for the amount of material used.

In the development of Victory sash, as the new product is named, only two mullion supporting members, each meas-



Write for Catalog and Prices
INGERSOLL STEEL & DISC DIVISION
BORG WARNER CORPORATION
NEW CASTLE, INDIANA

Plants: New Castle, Ind.; Chicago, III.; Kalamazoo, Mich.

## **ARMSTRONG**



RENCHES

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— Detachable Socket

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Construction
 Ratchets

There are ARMSTRONG Wrenches for your every need and each is the finest tool of its type.

ARMSTRONG Socket Wrenches extensions and handles are Chrome-Vanadium Steel. Ratchets are drop forged steel and the patented ARMSTRONG Drivelock locks sockets, driver, ratchets and handles to each

other — will not knock or pryapart, sockets can not fall off.

ARMSTRONG Giant Construction Ratchets are drop forged steel. Nut sockets are machined from solid bar stock.

ARMSTRONG Drop Forged



Structural and Construction Wrenches come in several types, in high carbon or Chrome-Vanadium steel. Large stubend box socket wrench takes long slip over handles.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Molder People"
3-34 N. Francisco Ave.
Chicogo, U.S.A.
Eastern Warehouse & Sales:
190 Lafayette St., New York

uring approximately 2x4 in. are used. The great majority of the frame members common to old-fashioned wood sash are eliminated. Instead of supporting complicated frames, stops and other elements, which, in turn, held the sash, the 2x4's now directly hold the glass.

#### **Prefabricated Units**

Each unit is built complete in the mill and shipped to the job where it is erected between head and sill, in the same manner as steel sash. No other frames or sills are required. As the units are erected, the mullions are joined by a coverplate of light pressed metal with a small intervening space for expansion and contraction. Calking compound furnishes complete weather proofing. At the sills, the wood sash is secured by metal clips clamped only at the mullions with regular mullion bolts. Calking at these points provides the necessary weathering. The sill is so designed as to eliminate crevices in which dirt and moisture might accumulate.

Since most industrial buildings have 20ft. column centers in the outside walls, a 4-ft. standard has been adopted though this, of course, is subject to change.

#### Simplicity of Design

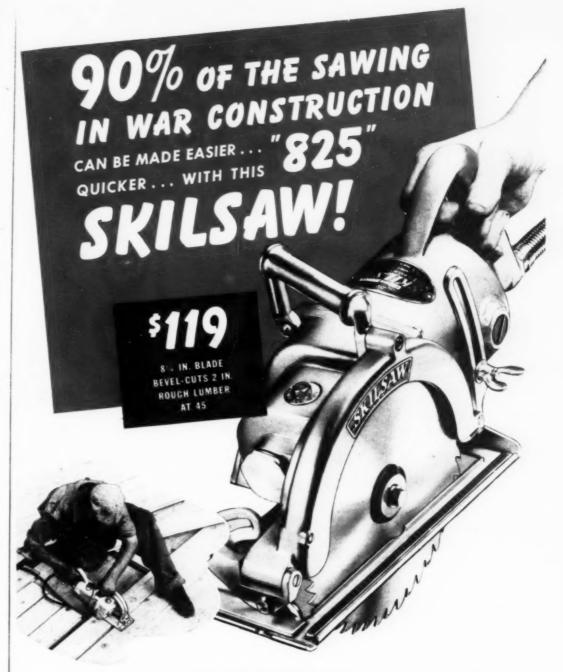
Sash and muntins in the new sash are simple in their design and relationship. Molding cut-outs are eliminated, so that the maximum wood section is maintained for maximum strength. The wood is beveled to provide a run-off for any moisture that may accumulate. Glazing is done on the inside, rather than the outside, so that the weaker part of the wood section and the putty are protected from the weather. The glass is secured on the inside by means of standard spring glazing clips such as are used in steel sash. A raised lug is provided on the inside of the mullion and muntin, and this provides a "footing" for a definite thickness of putty. Next to the Klug is a glazing clip groove which serves also as a putty anchor. Since putty tends to adhere more firmly to glass, there is far less chance, with this arrangement, for it to curl away from the wood surface.

The design of the muntins is such that the mortising of intersecting members is accomplished without impairment of their strength. Mortises are located inside the sash, away from the weather.

#### Steel Ventilator

Victory sash, has borrowed its ventilator from steel sash which, through years of development, has reached a high degree of perfection. The steel ventilator designed for use in wood sash is made complete with hinges, pivots, slides, push bar and chain pull. It can be adapted to gang, hand or motor operation. The amount of steel involved in the ventilator, by comparison with the amount of fixed wood sash in a given building, is so small that it can hardly be considered a drain on the steel supply.

An advantage claimed for this type (Continued on page 110)



Save time with SKILSAW . . . cu openings for vents, ducts and stairs after sub-flooring is loid.

trim decking after standard

• With Model "825" SKILSAW you can make almost every cut called for in War Construction . . . and make them easier, better, faster! That's why Model '825" is such a fa-

vorite with War-Work Contractors everywhere.

Every feature you need today, is built right into this one lightweight, big-capacity, fast-cutting saw. It has extra power for swiftest sawing in all materials . . . extra depth-of-cut in an 8½ inch blade that actually bevel-cuts 2 inch rough lumber at 45° . . . extra stamina to stand up under constant, toughest use. And in Model "825" SKILSAW you get all this for very little more than an ordinary 7 inch saw costs. If you're building for war, ask your distributor to demonstrate how much faster you can do it with Model "825" SKILSAW.

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SKILSAW
PORTABLE TOOLS
WAKE AMERICA'S HANDS MORE PRODUCTIVE &

save material handling

# YOUR TRUCK SERVES AMERICA



# KEEP IT SERVICED!

There are three mighty important reasons these days to protect and prolong the life and efficiency of your trucks. First —vital supplies and materials for both war front and home front must be kept moving without interruption or delay.

Second — rubber, fuel and parts must be conserved for our military vehicles. Third—with truck production curtailed, your present equipment may have to stay on duty for the duration. GMC "Victory Maintenance" is a complete war-time service program specially developed to help prolong truck life, restore peak performance, step up operating economy, and reduce servicing time and costs. Give

your trucks "Victory Maintenance" service and they'll serve America better. Ask your nearest General Motors Truck dealer for complete details.



Special "Service Payment Plan" available through our own YMAC

THE TRUCK OF VALUE

GMC TRUCKS

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

of ventilator is that at any future time, when realignment of a manufacturing operation calls for more ventilation, this can be achieved without difficulty. The light wood muntins can be removed and a standard ventilator installed without further changes.

#### For Factory or Office

The new sash is adaptable for use in factory or office partitions. It has sufficient strength, under ordinary conditions, to extend up to extreme ceiling heights without reinforcing. When in use as a partition the lower portion of a section of sash can be glazed with plywood or similar material. Where flush partitions are required, plywood can be fastened to both sides. The sash is of sufficient thickness to accommodate doors, with mullions serving as the door jambs. Each door unit replaces a sash unit. The door and the sash can be interchanged. Blackout requirements can be met by fastening sheets of plywood to the outside of the sash, with sections cut out to accommodate the ventilators. The ventilator units, themselves, can be given blackout treatment by means of various approved methods. Thus, ventilators can be operated except during periods of air raid alarms.

# Alaska Highway

(Continued from page 64)

the main highway project on which design and construction will be directed by the Public Roads Administration, represented by Dr. L. I. Hewes, Chief of the Western Region Office at San Francisco, Calif., and Joseph S. Bright, district engineer, with headquarters at Seattle, Wash.

According to latest plans the Alaska Highway, starting at Fort St. John, which is connected by an existing road with Edmonton to the southeast will extend in a general northwesterly direction through Fort Nelson, Watson Lake, Whitehorse, in the Yukon Territory, Dawson, Big Delta and Fairbanks, The route connects recently built airfields and is located in so far as possible beyond the range of possible air attacks from the Pacific Coast.

#### **Equipment Crosses Ice**

A race against time was won by the Army Engineers in getting the first shipment of equipment across the mile-wide frozen Peace River just before the break-up of ice would have made that operation impossible and caused weeks of delay. The trainload of equipment which made

(Continued on page 112)

# PARSONS TRENCHERS

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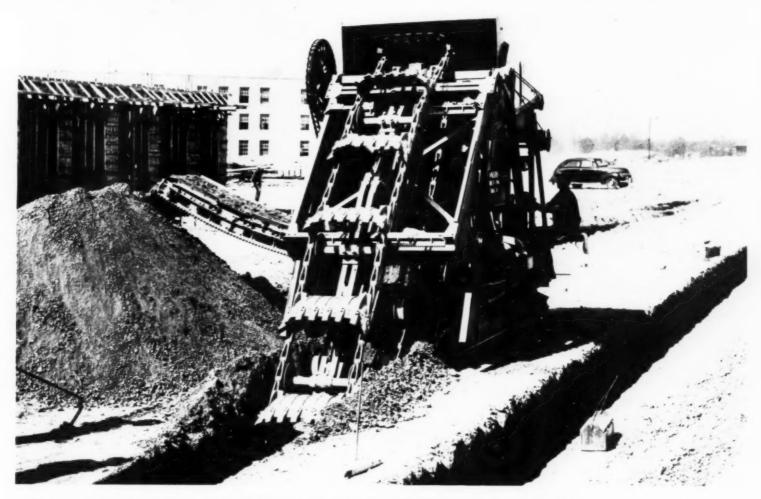
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## **AHEAD OF SCHEDULE!**

THE JOB AMERICA has to do demands equipment of round-the-clock stamina and proved aggressiveness. Modern efficient PARSONS TRENCHERS assures continuous profitable operation in any climate and in all classes of soil.

FOR SPEED clean and deep digging, Parsons has been the accepted standard for over thirty-five years.

ALL OVER THE NATION, Parsons Trenchers are doing their full share of vital work at Ordnance Plants, Army Camps, Air Ports, Naval Bases and Pipe Line Projects.

THE FACT that so many of these jobs are being completed ahead of schedule is a memorial tribute to the American Engineers and Contractors — The World's most efficient builders.



WE'LL MOVE THE EARTH
TO SERVE YOU

MORE DITCH PER MINUTE IS ASSURED - BUY PARSONS

THE PARSONS COMPANY, NEWTON, IOWA



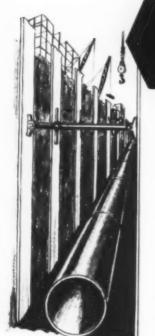
# THE SOLUTION

Special jobs often require special tools and while rock handling problems are doubtless common to many, OWEN has perfected and proved the special tool for this job in the Type RA Rock Grapple, Revolutionary, independent tine action, enormous lifting capacity and other exclusive features distinguish it decidedly from other equipment intended for like use. Write for the new catalog, just off the press.

OWEN BUCKET

6020 BREAKWATER AVE., CLEVELAND, OHIO

Branches: New York, Chicago, Philadelphia, Berkeley, Cal.



#### "Danger Above!!" Avoid It With Simplex Trench Braces

WHETHER planking or plywood is used to hold back the dirt, Simplex Drop-Forged Trench Braces will give longer service, easier adjustability and a greater margin of safety. They are the ONLY trench and timber braces made with drop-forged balls and sockets and lever nuts. They are unbreakable-stronger and more durable than malleable braces.

As a special safety feature, lever nuts are blunt, preventing injury to workmen and damage to clothing. In close quarters where a lever nut cannot be advantageously employed, the Simplex 3-way unbreakable nut can be used. This nut has three holes to fit a 1" round steel lever bar. No extra charge if ordered in place of regular nut.

The rugged bar and socket joint at each end of a Simplex Trench Brace permits speedy adjustment at any angle. Lugs on the face of shoes insure firm grip on plank or plywood. Adaptable to any width of trench by using proper length of pipe.

For especially wide and deep trenches, and foundation or subway jobs,

Simplex Drop-Forged Timber Braces are recommended. The screw ends are the same as those of Simplex Trench Braces. Send for Form Contractors '40.

#### TEMPLETON, KENLY & COMPANY

Better, Safer Construction Jacks Since 1899

Simplex Jacks A better Jack for every job -many jobs for every Jack Chicago, Illinois

the journey from Peoria, Ill., to Dawson Creek, comprised Caterpillar diesel tractors equipped with LeTourneau and La-Plant-Choate bulldozers. For installation on the tractors a shipment of Willamette Hyster winches had arrived from Portland, Ore., in addition to light power showels, cranes and heavy-duty rubber-tired haulage trailers. All of these units were rushed from the railhead overland a distance of 60 mi. to the river crossing at Fort St. John and reached the north side over the ice just before the spring crackup occurred. The accompanying photographs from the Caterpillar Tractor Co. show scenes of unloading the equipment at Dawson Creek and moving it under difficult conditions of transportation.

# Underpinning HOLDS SHOP WALL

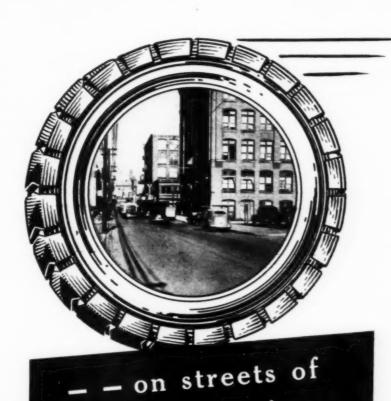
(Continued from page 45)

of H-beam blocking and steel plates, until the top of the cylinder reaches a point near the bottom of the pit. The material within the cylinder is then removed by a flat helical "pancake" type of earth auger, used generally in clay, and a midget Hayward orange-peel bucket for handling sand and gravel. This bucket, with its leaves in the open position, has a diameter of 12 in., just small enough to fit into the open end of the 14-in. steel casing. The bucket is hung from a well wheel on an A-frame extending over the pit. It will be noted in one of the photographs that the midget orange-peel bucket is equipped with a 12-lb. iron ball, bored through its center to slide up and down on a short steel shaft. To this ball is attached a rope so that when the bucket is lowered, with its leaves open, the ball can be raised and dropped, the impact of the blow forcing the pointed ends of the bucket leaves into the earth so that a good "bite" of material is obtained.

When the first section of the cylinder has been mucked out, another 5-ft. length is jointed to its top by means of a sleeve coupling. This coupling is a steel ring 6 in. high, with a diameter just enough smaller than that of the pile cylinders to insure a snug fit. Around its outer surface the coupling carries a circumferential shoulder against which butt the ends of the cylinder sections to be joined. After the sections of cylinder have been connected, the jacking down of the casing is continued.

The use of short, jointed sections of steel cylinder is made necessary by the limited headroom available in the working pit under the footing. The depth to which the sectional steel shell is jacked below the concrete footing in order to develop satisfactory bearing value of 40

(Continued on page 114)



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to ked to 40 Unessential driving on the nation's streets and

1500 U.S. cities

highways is being cut to the bone.

But within cities and between cities, our arteries for motor vehicle traffic still have a big job to perform—carrying vital war materials—speeding the movement of troops and their mechanized equipment—providing transportation for workers in defense industries.

Resilient, heavy-duty TEXACO Asphalt pavements play an important role in keeping this essential traffic rolling swiftly, safely, surely. TEXACO Asphalt pavements in 1500 U. S. cities and towns, together with thousands of miles of TEXACO-paved U. S. highways contribute vitally to the speed and efficiency of America's war effort.

# Keeping 'em rolling



-- on thousands of miles of U.S. highways

THE TEXAS COMPANY, Asphalt Sales Dept., 135 East 42nd St., New York City

Boston Philadephia Richmond Chicago Jacksonville Houston



TEXACO ASPHALT

How to get the most out

of your Hoist

For some time, the resources and facilities of the Clyde Iron Works, Inc. have been directed to the production of hoists, derricks and whirleys for the government and for those with high priorities who have defense contracts.

If you are fortunate enough to already own a Clyde hoist, you are assured of trouble-free operations ahead with long life, absolute dependability and safety.



LUBRICATION: Proper lubrication is very important to the life of the hoist. A few minutes a day will reduce wear through friction and add years of service. If you do not have a Clyde Lubrication Bulletin, we will gladly send one.



ADJUSTMENT: Careful, periodic adjustments of brakes, frictions and all wearing parts will give more efficient and satisfactory performance. Keep all bolts tight. Note parts subject to wear and replace if necessary.



CARE: If your hoist is a Clyde hoist, it does not have to be handled with kid gloves . . . Clyde hoists are husky machines built to stand up and take it. But any hoist will give longer service with care. A good operator can get more out of his equipment by skillful handling than by abuse. Many of the first Clyde hoists, built almost 40 years ago, are still in service because they were designed and built to give year-after-year of dependable service. Proper care of your hoist will keep it running.





#### CLYDE IRON WORKS, Inc.

**Duluth, Minnesota** 

tons per pile is about 17 ft. in this instance. The last piece of casing for each pile is cut to proper length by an oxyacetylene torch, so as to leave between the top of the cylinder and the bottom of the footing sufficient space for insertion of jacks to apply the test load and provide for permanently wedging the cylinder against the footing. On this underpinning job two 14-in. steel cylinders are put down from each pit under the pilaster footings of the building, and one cylinder under each section of wall between pilasters, as shown on the accompanying plan.

As it is being jacked down, a steel cylinder sometimes encounters a boulder. In this event an effort is made to dislodge or turn the obstruction with a wedge bar. Sometimes the midget orange-peel bucket proves effective in grabbing the boulder, if it is not of large size. If the boulder is too large to dislodge or break up and provides adequate bearing value the cylinder is

seated upon it and concreted.

After the entire length of the sectional steel shell has been mucked out, the casing is filled to the top with a 1:2:4 or richer concrete mix, using high-early-strength cement when the time element is important. The top of the concrete filling is screeded off level with the cylinder top and on the underside of the footing a steel plate is installed to provide a smooth horizontal bearing area for subsequent jacking operations. The steel plate is backed up with dry-packing in the form of a 1:1 mix of damp sand and cement. After the concrete in the cylinder has set, the pile is ready to be pretested as an underpinning element and to receive its working load.

#### **Load Application and Transfer**

Upon a square steel plate on top of the concrete-filled cylinder are set two 50-ton jacks, with space enough between them for insertion of a section of 12-in. steel I-beam, which, after the test load is applied, is wedged against the footing, replacing the jacks as a means of transferring the building load to the pile. Pressure is then applied to the pair of jacks so as to produce a 50-percent test overload on the cylinder, which is designed to carry 40 tons. This test load is held until settlement of the cylinder is within allowable limits. At this stage, and without releasing the load on the pile, a piece of 12-in. I-beam to serve as a wedging post, is cut to fit, when stood on end, the vertical space of 2 ft. 2 in. between the steel plates on the pile top and the under side of the footing. After the I-beam wedging post is cut to correct length its ends are smoothed and trued up by hammering on steel plates with a 12-lb. hammer, producing surfaces comparing favorably with milled ends. Steel wedges (14x2x½ in.) are next inserted between the top of this I-beam section and the steel bearing plate on the footing and are driven home with an 8-lb. hammer until the load of the footing is transferred from the jacks to the I-beam wedging post. The jacks then are removed, the I-beam post and wedges are perma-

(Continued on page 116)

# CONSERVE STEEL BY THOROUGH MACHINERY MAINTENANCE

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# MAKE EVERY PIECE OF EQUIPMENT LAST LONGER

(Reading Time: 38 seconds)

by thorough maintenance. Every extra hour of service you get from your wire rope saves just that much wear on the replacement rope. Give your ropes constant attention to reduce wear, abuse and replacement. When you inspect them, for instance, don't inspect for safety alone—inspect for good operating conditions. If excessive abrasion appears, it might have been caused by a point of rubbing or wrong fleet angle. Either may easily be corrected.

If your rope shows a concentration of broken wires in any one section, doubtless you can cut out a section of the end and pull your rope forward.... Or perhaps you can turn your rope end for end and have virtually a new rope to use.

Inspect for proper lubrication. Don't wait until your rope is dry to lubricate it. Lubricate your rope before it shows evidence of such need. A dry rope may be a ruined rope.

Get the recommendation of a Hazard wire rope man. Hazard LAY-SET PREFORMED resists bending fatigue, kinking and snarling. LAY-SET spools better, is faster and safer to handle, lasts longer.

Keep equipment in good condition.
Make it last longer.

#### HAZARD WIRE ROPE DIVISION

Makes Sarre, Pa., Atlanta, Chicago, Denver, Fest Worth, Les Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, L.

HAZARD LAY-SET Preformed WIRE ROPE

## TOOLS FOR A QUICK JOB OR A LONG ONE



Jackson Equipment is designed for fast, easy handling and built for months of rough treatment and exposure—an ideal combination for contractors engaged on big projects that now must be completed ahead of schedule... There's a Jackson distributor near you.

#### TYPE M11 CONTRACTORS BARROW

Preferred by many contractors because of their narrow. large capacity trays. Built to take rough treatment and long exposure. Available also with steel tubular frames and steel wheels. Standardized production assures lowest price consistent with high quality.



#### **TYPE 88 CONCRETE CART**

A perfectly balanced, easy to wheel vehicle with drop axle, roller bearings and pneumatic tires. Design and construction of bodies prevents opening at seams. Made oversize to give full six and one-half cubic feet wheeling capacity.

#### STEEL MORTAR MIXING BOXES

Formed from a single sheet of steel with corners lapped, riveted and reinforced with malleable iron sections. Bottom and sides are smooth inside and permit the material to be mixed and emptied with minimum effort. Made in three sizes.

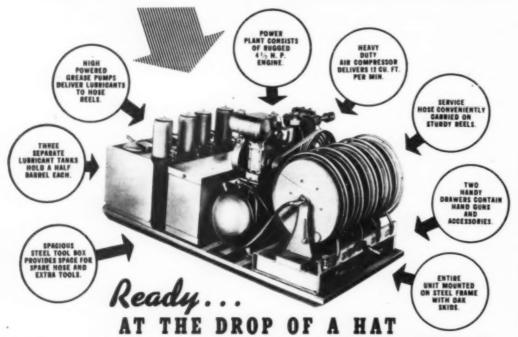


SEE YOUR SUPPLY HOUSE OR WRITE TODAY FOR NEW COMPLETE CATALOG

# JACTURING COMPANY

HARRISBURG, PENNA





Graco Convoy Lubers are complete portable lubrication units, assembled at the factory, for use in heavy duty field lubrication service "on the job". A wide variety of models is available, but each complete unit includes all the essential components of a lubrication department... an engine-driven air-compressor, a set of powerful automatic lubricant pumps for dispensing various types of lubricants under pressure, suitable lubricant tanks or container supports, a battery of hose reels with long lengths of service hose,

conveniently mounted where they are readily accessible, a spacious tool box for housing miscellaneous tools, handy drawer compartments for storing miscellaneous adapters, a complete kit of hand guns, a complete assortment of necessary lubrication adapters, a set of parts for emergency service. All component assemblies are rigidly mounted on a structural steel frame with oak skids. The units are ready to work for you when they arrive. Write today for details and specifications. Quick deliveries are assured.

GRAY COMPANY, INC.
Minneapolis, Minn.

(Continued from page 114)

nently encased in concrete and the approach pit back-filled.

The distinctive feature of the Pretest method of underpinning with sectional steel, concrete-filled cylinders is the uninterrupted maintenance of the full test load on the pile during the process of transferring the weight of the building footing from the jacks to the permanent I-beam wedging posts carrying the load from the footings to the pile tops. Experience has demonstrated that even a temporary release of this load, once it has been applied, causes the cylinder to rebound several inches, destroying the "bulb of pressure" built up in the soil under the pile by resistance to penetration as the cylinder is jacked down to its final depth. When this rebound occurs, and the load is reapplied, it is found that the cylinder must be forced down to a greater depth than was adequate at first in order to regain its original carrying capacity. By maintaining the full load on the cylinder continuously during the operation of wedging, no rebound of the pile is made possible and subsequent settlement is eliminated or reduced to a negligible amount.

#### **Driving Steel Piles for Column Footings**

After the foundation walls and footings of the existing building had been underpinned, excavation was carried down to grade (16 ft. below street level) for the basement of the plant addition alongside. In the new building, when completed, will be installed many heavy machine tools, imposing loads that call for columns on concrete footings designed to carry 120 and 180 tons. It was originally planned to drive wood piles to support the new column footings, but because of the presence of boulders and fine sand not easily drained, concrete-filled steel cylinder piles were substituted for the substructure and the Spencer, White & Prentis organization was selected to install them.

As indicated in the accompanying foundation plan for the new 50x85-ft. plant addition, the steel cylinder piles are grouped in clusters of 4, 5 and 6, depending on location, under the sidewalls and interior bays of the structure. The piles in each cluster are spaced 2 ft. 6 in. on centers. They are driven to a penetration of from 11 to 16 ft. below point of cutoff and are capped by rectangular concrete blocks reinforced with grids of steel reinforcing bars wired up into mats for placement as units at elevations 4 in. above the pile tops. The steel pile cylinders are 10 in. in diameter and have a wall thickness of he in. They are fitted on their lower ends with conical cast-steel driving points, welded to the casing.

Prior to pile driving, a rectangular pit was excavated to a depth of 4 or 5 ft. at the location of each pile cluster and sheeted with planks to serve later as forms for concreting the pile caps, which ranged in thickness from 2 ft. 6 in. for a four-pile footing to 3 ft. 9 in. for a six-pile footing. Pile driving was done with an Osgood steam-powered crawler crane equipped with 50-ft. long leads in which a McKier-

(Continued on page 118)

# HOWAND WHY AMS' TOOLS AID WAR PRODUCTION

J. H. WILLIAMS & CO., Drop-Forgings and Drop-Forged Tools, BUFFALO, N.Y.

## WILLIAMS' "SUPERIOR" (CARBON STEEL) WRENCHES

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For some years previous to the war, the popular trend was toward replacement of this type of wrench with alloy steel tools which usually were chrome-plated and more highly finished. Today, however, material shortages and the need for critical economy makes a close examination of the relative merits of carbon and alloy steel wrenches particularly timely. Since we manufacture both types, we can present the following facts and figures without bias or prejudice.

Williams' "Superior" Wrenches are forged from carbon steel, specially processed to exacting specifications. These wrenches have been improved to a point where they are substantially twice as strong as the earlier carbon steel wrenches of our own manufacture. Comparative tests demonstrate that they average (throughout all patterns and sizes) 93% as strong as our corresponding alloy steel wrenches. In the popular Double-Head Engineers' pattern,



Comparison of Double-Head Engineers' Pattern of Alloy (top) and Carbon Steel wrenches. Both wrenches have same openings.



Comparative strength tests were made in Williams' Laboratory with every size and type in the carbon and alloy steel wrench lines.

"Superior" (carbon steel) Wrenches are Economize with Carbon Steel Wrenches actually stronger than the corresponding. In view of today's conditions, we strongly sizes of alloy wrenches which are of thinner design. Other patterns in the Williams' line-are forged from identical dies whether of carbon or alloy steel thus the average shows a slight strength advantage in favor of alloy steel.

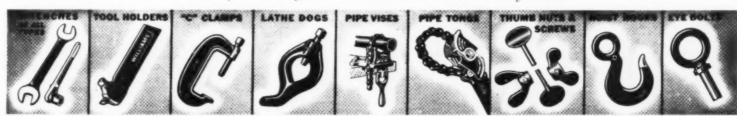
Against this slight advantage are the following practical considerations: Alloy steel wrenches cost nearly twice as much as Superiors"; critical alloys are needed in many items of war production where substitution is highly undesirable; in the Double Head Engineers' pattern, the thicker design of "Superior" Wrenches affords a more comfortable hand grip and a better bearing on the nut; the usual finish supplied on "Superior" Wrenches involves no critical material (such as chrome), since they are finished in bakedon enamel rather than plating.

recommend the use of "Superior" (carbon steel) Wrenches wherever possible. For most industrial applications, any advantage in alloy wrenches is negligible. Some types of close-quarters work require the thinner heads available in the Double-Head Engineers' pattern of alloy wrenches, thus justifying their higher cost.

An informative booklet, providing comprehensive data on standard wrench types is available without charge. Write for "How to Select and Use Wrenches."



Sold by Leading Industrial Distributors Everywhere



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330 West 42nd Street

New York, N. Y.

(Continued from page 116)

nan-Terry 9-B-2 steam hammer operated. After the steel cylinders in each cluster had been driven to the proper penetration they were filled with concrete and capped. Transit-mixed concrete from the plant of the Colonial Sand & Stone Co. was delivered to the job in Jaeger truck-mixers and chuted into the pits at each group of piles. The mix was 1:2:3½. At each footing pairs of steel bolts for anchoring the columns of the building were suspended within the forms and became embedded as the concrete rose to finished grade.

#### Personnel

In charge of field operations for Spencer, White & Prentis, Inc., on the underpinning of the existing machine shop and the pile substructure of the plant addition were George F. Flay, Jr., engineer and Mario Canale, job superintendent. The new building to expand the existing plant was designed by Theodore D. Alvy & Sons, engineers, Long Island City, and is being erected by Christie & Leiser, Inc.

# Trans-Isthmian Highway Provides Strategic Route Along Panama Canal

(Continued from page 62)

den Dam, about 1930; the road from Summit to the Pacific about 10 years earlier.

The Republic of Panama built a 2-mi. section of the Trans-Isthmian highway, from the Avenida Bolivar in Colon to a point near the Fort Randolph road. The construction under the supervision of the Public Roads Administration continues from this point near the Fort Randolph road to the Canal Zone border near Cativa and on through Panamanian jungle to Madden Dam, a distance of  $24\frac{1}{2}$  mi.

At the Pacific end, the Trans-Isthmian road intersects with the proposed Pan-American highway from the United States to South America. Between Texas and the Canal, the Pan-American route now includes about 1,775 mi. of paved and all-weather road, 650 mi. of dry-weather road, and 825 mi. of cart and foot trails.

Besides the Canal, and a railroad built by an American company about 1850, no other land or water transportation facility crosses the Isthmus. The French had to give up their attempt to build the Canal in the 1880's, partly because of such tropical diseases as yellow fever. These pestilences have since been controlled and health con-

(Continued on page 120)

#### **Contractors Handling Construction Contracts**

vital to our All-Out War Effort are using large numbers of "99M" Power Graders to complete jobs days or weeks ahead of schedule.



# MAKING THE GRADE On High Speed War Production



● Because the "99M" Power Grader handles bigger loads, can work under conditions that stall ordinary 2-wheel drive motor graders, and provides a number of very practical attachments that eliminate the need for much auxiliary equipment, it is unmatched for high speed handling of war jobs.

The superior performance of the "99M" is the result of powerful all-wheel drive, power operated steer on all four wheels, power blade shift, and maximum working weight. You'll move more dirt and move it faster with a "99M". This is true whether the work is in clay, sand, gravel, mud or loose soil...whether the footing is slippery, sloping, loose, irregular or rough.

For full facts on the help a "99M" and its attachments can give you in making the grade on high speed war construction, write for Bulletin 1946.

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois

MOTOR GRADERS - BLADE GRADERS - ELEVATING GRADERS - SCRAPERS - CRUSHING AND SCREENING PLANTS - ROLLERS ROLL-A-PLANES - MOTOR SWEEPERS - SHOVELS AND CRANES - SCARIFIERS - DUMP CARS - TRAIL CARS

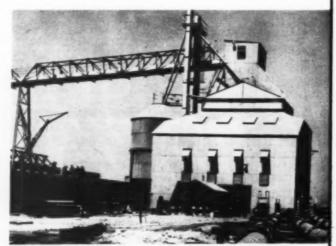
## "Damn the Rules— Full Speed Ahead!"

Those, essentially, were the Navy's orders with regard to its huge drydock building program. That program has seen startling developments, but none more so than the new underwater method of construction.

New methods require new equipment, and it is not surprising that it was Butler who developed the plant to handle this unique concreting method. And every yard of con-

erete poured in a tremie-built drydock has gone through a Butler plant.

This is but one example of the way in ful of dirt is turned, let the Butler man which Butler engineers are meeting the in; his suggestions may be invaluable.



call for speed and more speed. At those all-important conferences before a shovel-ful of dirt is turned, let the Butler man sit in; his suggestions may be invaluable.

Whatever your job, ask your Butler distributor or engineer — he may save weeks for you.

BUTLER BIN COMPANY
WAUKESHA WISCONSIN

## Universal gives u

760 Yards in
10½ hours of
"Our last tally was on April 29 when we ran better than a yard and a half per minute, a good part of the time with our 822-Q Plant; and Iowa limestone is no snap."

The portable primary, with apron feeder, has a 15" x 36" bronze

34 and Smaller Crushed Limestone"

Says Clarence Dewees,

This is another case where Universal took existing equipment, overhauled it and built it into a modern, efficient plant that provides greater yardage with no additional manpower and very little additional expense. It's service like this and profit-proved Universal equipment that has made Mr. Dewees a repeat buyer time and again.

bearing crusher in use nearly 17 years — has only had new bronzes a couple of times. The portable secondary crushing unit has a set

of rolls 7 years old, a 21/2 deck screen, 24" feed conveyor and 18"

under-conveyor from roll discharge to Rotovator.

In times like these, Universal Crushers really earn their service stripes by grinding out rock and gravel without being babied, save time and labor, conserve bearing metals and take the load off replacement parts in general.

UNIVERSAL CRUSHER CO.

327 8th Street West

Cedar Rapids, Iowa

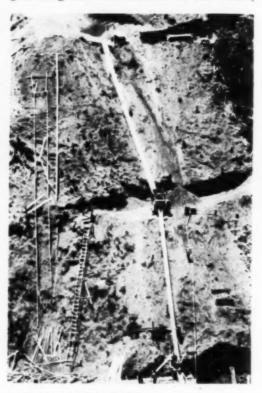




(Continued from page 118)

ditions are now much improved. The construction of the new highway is no longer the dangerous venture it would have been 25 years ago, United States engineers report.

The thousand men employed on the engineering and construction of the Trans-



**CULVERT CONSTRUCTION** was large item on Trans-Isthmian highway. Upper chute carries aggregates to mixer half-way down slope whence lower chute delivers concrete to culvert at bottom of picture.

Isthmian highway were housed in camps located at three points along the right-of-way. Electric-light plants were installed so that some of the work could be kept on a 24 hr. basis, 6 days a week.

#### Panama Labor Clears Land

Panamanian workmen equipped with machetes were used extensively for the unskilled labor in clearing and grubbing and other construction operations. Panamanian instrument men, chainmen, rodmen, and machete men worked with the engineering parties.

Operators for the heavy power equipment, such as the tractor-scrapers, power shovels, and bulldozers were brought from the United States, because of the need for men skilled in the use of this machinery. On grading operations the equipment included twenty-seven 12-cu.yd. tractor-scrapers, three 1½-cu.yd. power shovels, two ¾-cu.yd. draglines, four treedozers and fifteen bulldozers.

Sand and gravel for concrete were dredged from the Gatun River. Two 8-in. pumps mounted on barges pumped the material 600 ft. to a point where it was loaded into 6-cu.yd. trucks and hauled to the batching plant.

Intense rainfall, exceeding 100 in. annually, necessitated the construction of numerous drainage structures. In addition to concrete culverts the project includes

(Continued on page 122)

LATEST DEVELOPMENT IN STANDARD OIL'S FLEET CONSERVATION SERVICE

# **NEW HEAT-PROOFED** STANOLUBE Beats heat Cuts wear-Cleans engines

#### Timely motor oil discovery adds life to heavy-duty gasoline and Diesel engines

• It's NOT just another motor oil - it's a brand new, heat-fighting oil-"heatproofed" Stanolube H.D.! It's heat-proofed to stand up longer and to protect better against the more intense heat generated in modern engines

Today's internal combustion engines are far more reliable and efficient than the engines of 10 or even 5 years ago. But their higher compression pressures, closer fitting, faster moving parts build up heat. At some points reached by the oil, temperatures have increased 50° to 100° in the last few years. These modern engines must be protected by modern oil able to work in the searing heat that saps the protecting quality of ordinarily good oils.

Standard's research men tackled this problem. It took hundreds of experiments and tests - but they whipped it thoroughly with the new "heat-proofed" Stanolube

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Carbon - varnish - engine deposits - responsible for a large part of your maintenance expense and short equipment life practically disappear when you use the new Stanolube H. D.

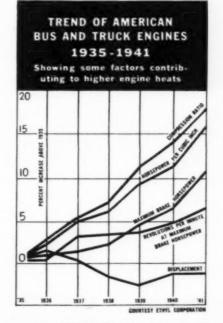
War-time requirements restrict the output of Stanolube H. D. But because of the vital need for conserving equipment, it has been made available to fleet operators. Take advantage of this opportunity to get help on the biggest job you have today-to make equipment last for the duration.

#### 25,000,000 MILES OF PROOF!

Laboratory experiments indicated that Stanolube H. D. was an outstanding development in motor oil. But that wasn't enough evidence. It had to prove itself in

Standard Engineers started looking for trouble-fleets that were hard to lubricate fleets with varnish problems-sludge conditions-short piston and valve life

To date, Stanolube H. D. has operated



more than 25,000,000 miles on the toughest lubricating jobs that could be found. And every mile has given added proof that Stanolube H. D. Beats Heat . . . Cuts Wear . . . Cleans Engines.

#### TYPICAL SERVICE TESTS:

A WISCONSIN BUS COMPANY had trouble with varnish formation. Valves were being reconditioned at 15,000 and pistons at 30,000 miles. A test bus operated 27,000 miles before valves were ground and 57,000 miles on one set of pistons with Stanolube H. D.

TWO DIESEL-POWERED TRUCK TRACTORS at a Minnesota freight line were put on Stanolube H. D. The engines were taken down at 130,000 miles to examine the needle bearings on wrist pins. Condition of the pistons, valves, and cylinders indicated that these engines could have operated for a much longer period without any trouble.

A MINNESOTA TRUCKING COMPANY started two new gasoline-powered truck tractors on Stanolube H. D. One has operated 90,000 miles, the other 70,000 miles. No mechanical work has been needed on either engine. Bearings have been inspected but none replaced.

There's 25,000,000 miles of evidence like this that Stanolube H. D. is the oil vou need.

#### ASK TO SEE THIS BULLETIN

Ask a Standard Automotive Engineer to show you his Engineering Bulletin describing tests made on Stanolube H. D. and

Stanolube H. D. and illustrating the startling results obtained using this new product. Write Standard Oil Company (Indiana), Rm 1223, 910 S. Michigan Avenue, Chicago, Illinois, for the Engineer nearest you. In Nebraska, write Standard Oil Company of Ne-Company of Nebraska at Omaha



OIL IS AMMUNITION . . . USE IT WISELY

STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE MILEGES



larger bridges are of steel with concretepaved decks and roadway widths of 26 ft.

between curbs. They are designed to permit the safe passage of 55-ton tanks.

profitably...GET DEPENDABLE EQUIPMENT .. Buy the Fast ...

JACKSON Hydraulic Concrete Vibrator

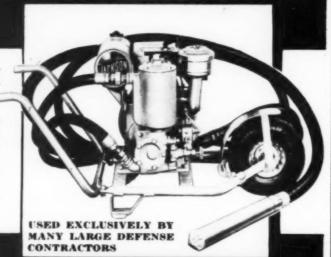
DESIGNED TO "TAKE IT" 3 SHIFTS A DAY EVERY DAY

Automatic pressure lubrication—requires no attention. 34-ft. hose—23/4" vibrator head.

Adjustable frequency to 6800 R.P.M.—submerged in concrete. Powerful gas engine—4.7 H.P.

Long lived, ball-bearing, rotary, hydraulic pump. (Used exclusively by many

large defense contractors).



ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

3 Reasons why You're ahead with

# Reliance

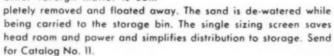
SAND and GRAVEL Washing and Handling Units

Foreign substances completely removed.

Sand thoroughly de-watered.

Saves head room, power—simplifies distribution.

The best results in cleaning sand and gravel are obtained through the use of Reliance System Revolving Screens and Paddle Type Boxes. Clay, loom and other foreign matter is com-



#### UNIVERSAL ROAD MACHINERY CO.

KINGSTON, N. Y., U.S.A.

Distributors in ALL principle cities of the U. S. A.



Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revalving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettlos; Bin Gates; Fooders; Belt Concypers; Grizzlius; Air Segaroters; Sand and Gravel Spreadors; Wash Bax=s. Three Types of Truck

Deliver Fill for

Santa Ge Dam

(Continued from page 59)

two sizes. The contractor has chosen this gravity-feed design as the one to be used in building additional grizzlies which will be required later for the second half of the job. The reason for this choice is that although the mechanical grizzly capacity is greater and permits trucks to discharge their loads and get away quicker, yet the risk of breakdown, cost of maintaining equipment and difficulty in getting replacements under present war-time conditions, make it more desirable to use the gravity type.

The gravity grizzly has two flights of bar screens, each 8 ft. long. The bar spacings increase toward the lower ends (from 13/4 in. at the top to 53/4 in. at the bottom) to prevent rocks from wedging between the bars. Spaces between bar groupings

are covered with steel plates.

Experience thus far on this job suggests an improved arrangement of the bars in the grizzlies yet to be built. Instead of the 8-ft. length, a better arrangement, it is expected, will be twice the number of 4-ft. long bars, with separations ranging from 33/4 in. at the top to 53/4 in. at the bottom. This will afford more open space and correspondingly quicker escape of minus-6-in. materials through the bars. This arrangement also affords less blank space on the grizzly. Heavy chains, of the type used for ship anchors, that were put in as a curtain to prevent bounding rocks from jumping the barriers, have not been found necessary if the trucks are spotted in the proper position when they dump.

#### **Zoning of Material**

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In the transition zones (Zone 2) on either side of Zone 1 of the fill for the dam, care is taken, first, to avoid very large cobbles that might wedge between the feet of the sheepsfoot rollers and, second, to maintain a gradual rate of change in porosity from the impervious core material to the relatively porous material of Zone 3. This latter procedure is followed so that there will not be a sharply defined plane in which the rate of percolation changes so rapidly as to give rise to the risk of flushing out fines.

In Zone 3 it was found that desired density could be obtained with material placed

in 12-in. layers, flushed with 35 to 50 gal. of water per cu. yd. even when given no rolling other than that provided by the passage of equipment used on the work. Density in Zone 3 material has averaged 140 lb. per cu. ft. Sprinkler trucks are supplied from a water line carried along the fill to a 12,000-gal. tank mounted on skids so it can be moved as desired. The tank is equipped with a float-operated valve and remote control for a motor-driven pump which automatically replenishes the supply in the tank.

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The Zone 5 material—the rock exceeding a 6-in. size — of which a total 2,430,000 cu.yd. will be required, is delivered by the side-dump trucks which have heavily reinforced bodies well suited to withstand the batterring of cobbles. In this zone it has been found possible to dump in the required position with only the aid of a bull-dozer to clean up along the top of the fill after the trucks have discharged their loads.

#### Personnel

For the U. S. Engineer Department, which is directing work on the Santa Fe Dam, Col. Edwin C. Kelton is district engineer at Los Angeles, and James G. Morgan area engineer in immediate charge. For the contractors R. F. Rasey is project manager; A. H. Johnson, general superintendent; C. S. Bradley, project engineer; Marc Smith, master mechanic; George Haensel, excavation superintendent; and C. C. Gail, equipment superintendent.

Equipment Used on 12,000,000-Cu.Yd. Fill for SANTA FE DAM

- 1 Marion electric shovel (No. 4161) 6-cu.yd. bucket
- 1 Marion electric shovel (No. 4121) 4-cu.yd. bucket
- 4 Northwest (80 and 80D) power shovels with 2½ cu.yd. buckets
- 1 P & H 955 crane with 90-ft, boom (for placing concrete)
- 22 Euclid bottom-dump trucks rated at 13-cu.yd. capacity (capacities increased about 2 cu.yd. by 9-in. raise of sidewalls)
- II Maxi (140-M) 6-wheel side-dump trucks of 20cu.yd. capacity
- 9 Maxi (WC-60) 6-wheel end-dump trucks of 12cu.yd. capacity
- 4 Euclid 4,500 gal. semi-trailer sprinkler wagons (pumps designed for delivery of 450 gpm. at a constant rate of flow so that quantities of water delivered can be closely controlled for a given speed of the truck)
- 12 D-8 Caterpillar tractors
- 2 D-7 Caterpillar tractors
- 1 International TD-18 tractor
- 4 Motor patrols
- 72-in. Stevens-Adamson feeder (under mechanical grizzly) operated by 200-hp. General Electric motor

#### CORRECTION

THE CONTRACTORS for the 25,000-man Army camp in California, described on page 62 of the May issue of Construction Methods, were McDonald & Kahn, Inc., and J. F. Shea Co., Inc., and not the Twaits - Morrison - Knudsen organization which handled construction of another Army camp on the Pacific Coast.



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#### "ROADS TO VICTORY"

By Lt. Col. A. R. Ginsburg General Staff, War Department

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#### TRANSPORT MIXER

with full open top construction permits visible mixing while loading, thereby eliminating necessity of conditioning concrete an arrival at job — saving time.

Revolving blade mixing is faster — side and rear discharge reduces delay on arrival at job. You save time by charging your truck faster due to open top, stationary drum. Larger profits are produced by means of the TRANSPORT MIXER'S greater flexibility. Operators report 25 to 50 cents per cw. yd. lower casts.

Power take off operation, reduction in dead weight and gas consumption and elimination of auxiliary water tank, means conservation of critical material and a saving to you.

Self-supporting and self-locking side discharge chute — corner fillets on interior of drum to eliminate corner build up — replaceable steel liner plate preserves original drum shell and electric welded construction reduces depreciation on minimum.

Get the complete important TRANSPORT MIXER story send for bulletin giving views of TRANSPORT MIXER in action— for that next job find out what this equipment can do for you.

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on BLUE BRUTE Portable Compressors,
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Worthington Pump and Machinery Corp.

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● Twenty years ago, as little lads, these fighting men of today were pedaling tricycles down quiet streets, with no knowledge of a war just ended; no idea of a

still greater war to come-a war in which they were to play so important a part.

Twenty years ago, in a world at peace, The Sisalkraft Co. began producing a tough reenforced waterproof paper, named SISALKRAFT, with no comprehension as to the important part it, too, would play in this world war.

For twenty years, The Sisalkraft Co. has been acclaimed the leader in the development and production of reenforced papers—papers that are recognized in all parts of the world because of their outstanding performance in automatic curing of concrete, their water proof protective quality, and their almost unbelievable strength.

As a result of these twenty years of constant development and improvement, and due to exclusive construc-

tion methods and the designing of special equipment and machines, the SISALKRAFT of today requires a very minimum of sisal fibres.

In addition, there is a saving of vital time and labor because SISALKRAFT is now produced 15 times faster than many of the materials that it is so effectively replacing, and it is requiring only 11% as much labor.

At the same time SISALKRAFT is releasing burlap, tarpaulin and other fabrics and protective materials for other important war uses.

Today the entire production of SISALKRAFT is being used for only those essential applications that will hurry the day of Victory.

It is curing the concrete floors in giant arms plants and factories from coast to coast. It is curing runways on vast new flying fields and hundreds of miles of strategic highways and access roads. It is protecting valuable materials and irreplaceable machinery and vital supplies.

The SISALKRAFT method of concrete curing has wide endorsement and acceptance among architects, contractors and engineers. It is smooth, efficient, automatic—and does the job with less manpower and material, and at low cost.

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No vibration. No frac-ture of materials. Drills through reinforcing rods.

Used also for test cores. Model H-S 2 - 1/2" to 2'

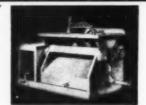
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This "Where to Buy" Section supplements other advertising in this magazine . . . 11's a good habit to check this page —

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Available immediately at Panama ready for shipment.

- 1-P&H CRAWLER CRANE model 655 gasoline driven, 100' boom 30' jib.
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- 20 ton STIFF LEG TRAVELLERS complete with 3 drumboisting engines with swingers.
- 2-210' Ingersoll Rand COMPRESSORS. Other cranes, derricks and erection equip-ment available at New York.

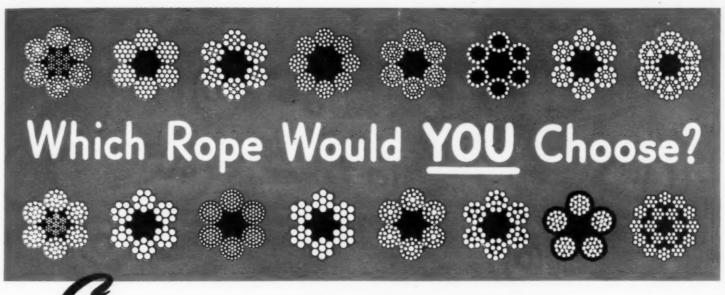
Also all types of steel erection tools and equipment.

FS-131 Construction Methods 330 West 42nd St., New York City

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Concrete VIBRATORS and Grinders

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# CONCONCY DEPENDS ON THE RIGHT CHOICE

(Reading Time: 30 seconds)

There is a wire rope for every application. Make sure you are using the proper rope on each installation. The wrong rope can be extremely wasteful of time, money and steel.

Some machines have sheaves which impose severe bending strains on the rope. On some machines the cable drags through abrasive stone, gravel or rock. Some ropes must endure the heat of handling ladles of molten metal, while others must run at excessively high speeds. For each job there is a one best rope, not only in construction but grade. Consult an American Cable engineer.

Ask him also about American Cable TRU-LAY PREFORMED wire rope.

TRU-LAY has set new and higher standards for wire rope service.

Conserve steel, time and money by using the proper construction and grade of American Cable TRU-LAY Preformed.

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# MORE BRUTE MUSCLE PER POUND



You'll get more punch per pound of air, more staying-power per pound of equipment, with Worthington Blue Brutes in '42!

The rugged "Rockmaster" Wagon Drill (type UPW-35 shown here) is typical of Worthington's complete range of handheld rock drills, tampers and paving breakers. They're built to use less air, and stay on the job longer, at costs surprisingly low!

Smooth, easy-handling strength is characteristic of Worthington's Blue Brute compressors, too. All equipped with Worthington's famous cost-saver — the Feather\* Valve...they deliver more air,

at less cost, under the widest range of operating conditions.

Put your men on the job with Blue Brutes, now! A trial will prove to them and to you that you get more WORTH from air with Worthington.

#### Free EQUIPMENT-SAVER

A new EQUIPMENT-SAVER—simple, easy-to-read instructions for tool conservation, ready to post on the job—is yours for the asking! Your nearest distributor, listed on page 124, has reserved yours. If your distributor is not listed, let us send you this free cost-cutting aid to efficient production direct from Holyoke.

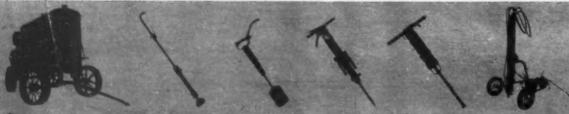
On the Job with

## BLUE BRUTES

"5% more holes per day," says this Super. "The Worthington UPW-35 Wagon Drill is easy to set up. Our operators like its 360° U-arm movement in any direction and the new freedom from stuck steels. They like the fact it can drill a toe hole 2 feet below grade. Yesterday, we began drilling shattered rock, but still put down more holes per day than with our previous equipment."

On hundreds of Army, Navy, Air Force and Ordnance projects all over the country, Blue Brutes are at work.

# Get more WORTH from air with WORTHINGTON BUY BLUE BRUTES



Compressors from 60 to 500 cu. R. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have

always set the pace for easy operation — available in a wide range of weights and sizes.

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